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NIDR Behavioral and Social Studies

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U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
Public Health Service
National Institutes of Health

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NIDR BEHAVIORAL

and

SOCIAL STUDIES

Edited by:

Patricia S. Bryant
Rosalynde K. Soble
Lois K. Cohen

U.S. Department of Health and Human Services
Public Health Service
National Institutes of Health
National Institute of Dental Research

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INTRODUCTION

This compendium of research abstracts summarizes all behavioral and social research funded by the National Institute of Dental Research from its inception in 1948 through March 1, 1981. A major purpose of this volume is to assist investigators in identifying relevant behavioral and social science research in dentistry, and thus to encourage oral health research which takes full advantage of prior knowledge and experience. Since no single journal or index covers most dental behavioral/social research, the need for such a volume is apparent. The NIDR also intends this document to aid in conveying information resulting from its research investment. Audiences for this information include dental researchers, behavioral and social scientists active in other health research areas, dental educators, dental administrators, and dental practitioners.

Projects summarized in this compendium were selected because they included behavioral and/or social research substantive content, or used behavioral/social science research methodologies. Some of the projects included are subcomponents of larger research projects which address primarily dental research issues, with a secondary emphasis on behavioral aspects.

Behavioral and social science supported through all available support mechanisms is included. A description of relevant research support mechanisms (e.g., research grants, new investigator awards, contracts, program projects, intramural research) is provided on pages 16-17.

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Approximately half of the research summarized was funded through the NIDR's Pain Control and Behavioral Studies Program Branch (Extramural Programs). The remaining research supported extramurally was funded primarily through the NIDR's Craniofacial Anomalies Program Branch and the National Caries Program. Also summarized here is some of the intramural research conducted within the NIDR's Neurobiology and Anesthesiology Branch, and the Oral Pharyngeal Development Section, Diagnostic System Branch. The bibliographies following research project abstracts indicate only articles published or accepted for publication and research abstracts published in the three years (1978-81) immediately preceding the preparation of this volume. Earlier published abstracts were omitted, as were speeches or other presentations reporting project findings.

Although other classification methods could have been used, the present volume organizes the abstracts around current research objectives for the Pain Control and Behavioral Studies Program Branch. Primary and secondary relationships to these research objectives have been assigned and are noted at the top of each abstract. All projects are cross-referenced to the objectives stated on pages 11-15.

For further information about behavioral and social research in dentistry, contact the investigators cited in this publication or the National Institute of Dental Research, National Institutes of Health, Public Health Service, Department of Health and Human Services, Bethesda, Maryland 20205.

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May 1, 1981

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PROGRAM OBJECTIVES

NIDR'S PAIN CONTROL and BEHAVIORAL STUDIES PROGRAM*

Behavioral and Social Science Component:

To determine how behavioral, social, cultural and economic factors influence oral health, and oral diseases or conditions.

Objective 1. To identify the behavioral, social, cultural and economic factors associated with the occurrence of oral health or the incidence and prevalence of oral diseases or conditions.

- Social - epidemiological measures for the assessment of these factors will be developed, evaluated, and standardized.
- Behavioral - epidemiological measures for the assessment of these factors will be developed, evaluated and standardized.
- Social - behavioral variables related to the onset and outcomes of oral diseases and/or conditions will be described.
- Dynamic relationships among social-behavioral variables and oral health, diseases and/or conditions will be described.

Objective 2. To identify the psychosocial correlates of variation in oral-facial structure and function.

- Factors which determine self-perception and social perception of oral-facial variations will be identified.
- Relationships between psychosocial functioning and oral-facial variations (such as malocclusions, dento-facial abnormalities, and acquired or congenital facial anomalies) will be described.
- Changes in psychosocial functioning associated with various treatment interventions and rehabilitation (such as orthodontics, orthognathic surgery, surgical reconstruction) will be described.
- Interventions to optimize psychosocial functioning in persons with oral-facial variations will be developed and evaluated.

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Objective 3. To determine the socio-behavioral impact of oral health, diseases, c onditions, and treatments upon individuals, institutions and communities.

- Reliable and valid methods will be developed for measuring the sociobehavioral impact of oral health, diseases, conditions or treatments.
- The sociobehavioral impact of oral health, diseases, conditions, or treatment on individuals, institutions, or communities, will be described.

Objective 4. To determine the role of stress and other emotional states (positive and negative) in oral diseases and conditions.

- Measures for the evaluation of emotional states in relation to oral diseases and conditions will be developed, evaluated, and standardized.
- Relationships between stress/emotional states and the development of oral diseases and conditions (such as caries, periodontal diseases, herpes and apthous ulcers, TMJ disorders, and bruxism) will be determined.
- Relationships between stress/emotional states and fluctuations in oral disease status will be determined.
- Interventions to minimize harmful effects of stress or other emotional states on oral status will be developed and evaluated.

Objective 5. To determine how behavioral factors influence dental relevant physiological functions.

- The relationship between behavioral factors and salivary activity and composition will be determined.
- The relationship between behavioral factors and vasomotor changes in the oral cavity will be determined.
- Behavioral factors associated with the control of bleeding from oral structures will be identified.

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- Other dentally-relevant physiological functions which are influenced by behavioral factors will be identified.
- Behavioral techniques which can modify dentally relevant physiological functions will be developed and evaluated.

Objective 6. To determine how oral-motor behaviors influence oral diseases, conditions, and dental treatment.

- Reliable and valid measures of oral-motor behaviors will be developed.
- Relationships between oral-motor behaviors and dental treatment, oral diseases or conditions will be determined.
- Developmental characteristics and consequences of oral-motor behaviors will be identified.
- Learning aspects of oral-motor function will be identified.
- Preventive treatment procedures (interventions) which reduce bruxing, TMJ disorders, and other dysfunctional oral behaviors will be developed and evaluated.

Objective 7. To determine how individual, institutional, societal, economic, and cultural factors influence adoption and maintenance of preventive measures.

- Factors which influence the use of oral health preventive measures by the public, dental professionals, institutions, and communities, will be identified.
- Dynamic relationships among factors influencing use of preventive measures will be described.
- Interventions for facilitating adoption of preventive measures will be developed and evaluated.

Objective 8. To identify the individual, institutional, societal and cultural factors that influence the seeking of professionally administered dental care.

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- Factors which promote or inhibit the seeking of dental care, including characteristics of the patient, the dentist, dental setting, and treatment modalities, will be identified.
- Dynamic relationships among factors influencing dental care-seeking behaviors will be described
- Interventions intended to increase appropriate dental care-seeking behaviors will be developed and evaluated.

Objective 9. To determine the roles of dental fear in oral health and dental treatment.

- Epidemiologic measures of the incidence, prevalence, and health consequences of dental fear will be developed.
- Origins and developmental antecedents of dental fear behaviors will be determined.
- Procedures for assessment of dental fear in natural, clinical, and experimental settings will be improved.
- Procedures for preventing dental fear in children and adults will be developed and evaluated.
- Procedures for reducing fear behaviors associated with dental treatment in children and adults will be developed and evaluated.
- The usefulness of dental fear as a model for basic studies of fear will be evaluated.

Objective 10. To identify the sociobehavioral and cultural variables which affect the processes and outcomes of dental care in different settings and in different populations (e.g., medically, physically, or mentally comprised individuals, children, the aged, and minorities).

- Factors which affect the behaviors of providers and patients in the conduct of dental care will be identified.
- Dynamic relationships among factors associated with behavior in the context of dental care, (e.g., patient-dentist interactions, management strategies) will be described.

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- Interventions for increasing effective behaviors in the context of dental care will be developed and evaluated.

Objective 11. To identify factors related to acceptance and use of dental appliances and other oral prostheses.

- Sociobehavioral and cultural factors which determine patients' decisions about dental appliances and prostheses will be identified.
- Behavioral, social and cultural characteristics predictive of appropriate use of dental appliances and prostheses will be determined.
- Strategies to increase the probability of acceptance and use of dental appliances and prostheses will be developed and evaluated.
- Social and self-perception of the acceptability of dentures and other oral prostheses will be determined.

Objective 12. To identify factors related to diffusion or adoption of research findings to the public, providers, and institutions.

- Variables influencing the diffusion or adoption of research findings (such as characteristics of individuals, groups, institutions, or the research findings themselves) will be described.
- Mechanisms by which social-behavioral factors affect diffusion and adoption of research findings will be described.
- Intervention strategies for improving diffusion or adoption of research findings will be developed and evaluated.

*Developed by program staff based on recommendations from an interdisciplinary expert panel convened on Jan. 16-17, 1980.

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SUMMARY OF NIH PROGRAM SUPPORT MECHANISMS

Research Project Grant (R 01)	Research project grants are awarded to an institution on behalf of a principal investigator to facilitate pursuit of a single scientific focus or objective in the area of an investigator's interest and competence.
Program Project Grant (P 01)	Program project grants are awarded to an institution on behalf of a principal investigator for the support of a broadly based, often multidisciplinary, long term research program with a particular major objective or theme. A program project involves the organized efforts of groups of investigators who conduct research projects related to the overall program objective. The grant can provide support for the projects and for certain shared resources needed for the total research effort. Each project supported under a program project grant is expected to contribute to the overall program objective.
Center Grants (P 50)	Center grants, awarded to institutions on behalf of a program director and a group of collaborating investigators, provide support for long term, multidisciplinary programs of research and development. Center grants are more likely to have a clinical orientation and are usually developed in response to announcements of the specific needs and requirements of a BID.
Conference Grants (R 13)	The NIH provides funding for conferences planned for the purpose of coordinating, exchanging, and disseminating information related to its program interests. Generally, such awards are limited to participation with other organizations in the support of conferences rather than provision of sole support.
Research Career Development Award (K 04)	The Research Career Development Award (RCDA) is a special salary grant to enhance the research capability of individuals in the formative stages of their careers. The awards are available for persons whose research potential is apparent but who need additional experience in a productive scientific environment conducive to the development of a career in independent research.

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New Investigator Research Award (R 23)	The New Investigator Research Award is designed to encourage both new investigators and those who have interrupted early promising research careers to develop their research interests and capabilities. To help bridge the transition from training status to that of established investigator, these awards provide funds for relatively inexperienced investigators with meritorious research ideas.
Research Training (National Research Service Awards)	National Research Service Awards (NRSAs) are for the training of biomedical and behavioral scientists in area of national need. NRSAs take the form of either individual fellowships or instutional fellowships ("training grants").
Individual NRSAs	Individual NRSAs are made to applicants for postdoctoral research training. Before applying, each applicant must arrange to work with a particular sponsor affiliated with an institution that has the staff and facilities needed for the proposed training. Federal laboratories, such as those of the NIH intramural programs, are among the eligible organizations. Recipients are selected through national competition.
Institutional NRSAs	Institutional NRSAs may be awarded to a domestic public, nonprofit private, or Federal institution to support a training program in a specific area of research. In most instances, support for both pre- and postdoctoral trainees may be requested. The applicant institution must have, or be able to develop, the staff and facilities required for the proposed program and is responsible for selection and appointment of trainees.
Contracts (N 01)	NIH research and development contracts are awarded to nonprofit and commercial organizations to foster and direct scientific inquiry toward particular new areas of research and development and to utilize advances in knowledge and technology to search for solutions to specific questions. Contracts are conducted with close NIH direction and monitoring; negotiations afford the contracting parties flexibility in establishing the details of their relationship at the outset of the contract work.

* summarized from NIH EXTRAMURAL PROGRAMS, 1980

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A. PSYCHOSOCIAL CORRELATES OF VARIATIONS IN ORAL-FACIAL STRUCTURE AND FUNCTION

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PROJECT TITLE: Development of Methodologies for Behavioral Measurements Related to Malocclusion

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Judith E. Albino, Ph.D.
Department of Behavioral Sciences
School of Dentistry
State University of New York
Buffalo, New York 14226

PROJECT NUMBER: NO1 DE-72499

PROJECT PERIOD: 3/77 - 12/80

PURPOSE:

The purposes of the project were 1)to identify social and psychological variables associated with malocclusion or the perception of malocclusion and 2)to develop reliable and valid methods for their assessment.

METHODS AND FINDINGS:

Two rounds of data collection were completed. Each sample included a) children who planned to begin orthodontic treatment within six months and their families and b) children who had been randomly selected from school rosters and who had no plans to obtain treatment and their families. Subjects, their mothers, fathers, and siblings nearest to their own age were interviewed, tested, examined and photographed.

Final results indicated that the most salient variables for discriminating those subjects who planned to obtain orthodontic treatment from those who did not were:

- the objective measure of malocclusion
- self-perception of occlusal characteristics
- self-report of desire for orthodontic treatment.

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Additional findings of interest suggest that:

(1) children seeking orthodontic treatment and their mothers appear to share values and perceptions related to the child's appearance, while the fathers' perceptions are less consistent; such patterns may be related to the traditional maternal involvement in their children's dental health care and other aspects of physical and social development.

(2) the esthetic impact of occlusal status on dental-facial attractiveness can be assessed with reliability and validity; the relationship of functional malocclusion with esthetic impact on dental-facial attractiveness was most substantial for the visually salient aspects of malocclusion, e.g., overbites, overjets and tooth displacements.

PUBLICATIONS:

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PROJECT TITLE: Habilitation of the Cleft Palate Individual

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Edward Clifford, Ph.D.
School of Medicine
Duke University
Durham, North Carolina 27710

PROJECT NUMBER: P01 DE-1899

PROJECT PERIOD: 6/63 - 6/77

PURPOSE:

The overall objective of this multidisciplinary longitudinal study was to study previously treated or untreated cleft lip/palate patients to assess the various treatment procedures employed.

Specific objectives included:

(1) Assessment of previous and present treatment procedures such as surgery, orthodontic treatment, speech pathology, psychological and audiological services as related to patient outcomes.

(2) A broad study of the relationship of oral and facial deformities to speech.

(3) A longitudinal and cross sectional study of the growth and development of the face and jaws.

(4) A study of the effects of early bonegrafting in alveolar and palatal clefts upon the growth and development of the premaxilla, maxilla, palate and face.

(5) An investigation of the effects on speech and dentition treatment secondary to bone grafting in alveolar and palatal clefts.

(6) Longitudinal investigations concerning the language development of the cleft palate child.

(7) An expansion of the psychological investigation of the impact of the cleft lip and palate on children and their parents to evaluate the influence of cleft lip and palate on developing self concepts and body images.

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METHODS AND FINDINGS:

The research program studied 2200 previously treated cleft lip palate children with assessment of previous surgical techniques, speech, appearance, growth and development of maxillofacial area. A longitudinal serial study of all cleft lip palate individuals were studied from birth to maturity. The psychological and social status of post-operative individuals were investigated as part of the longitudinal study.

Psychosocial findings include the following:

(1) Measures indicated that cleft palate children perceived their affliction more positively than they viewed asthma, amputation, or crippling conditions. Cleft palate was not perceived by children as a devastating disorder.

(2) The investigators studied the impact of the birth of a cleft palate child on family adjustment. They reported that the family did not collapse following this event; relationships within the family actually improved in some areas.

(3) Informing the mother without delay of the birth of a defective child minimized the negative impact of this event on the family.

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Clifford, E.: Psychological and social effects of facial disfigurement. In Hulek, A. (Ed.): Wprowadzenie do pedagogiki reqalikacyjnej. Warsaw, Poland, Panstwowe Wynawnictwo Maukowe, 1977.

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PROJECT TITLE: Craniofacial Anomalies - Etiology and Treatment

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

John M. Converse, M.D.
Department of Surgery
New York University Medical Center
New York University
New York, New York 10016

PROJECT NUMBER: P01 DE - 03568

PROJECT PERIOD: 3/77 - active

PURPOSE:

This extensive research program project has focused on collecting and analyzing longitudinal data on the anatomical character of craniofacial malformations and longitudinal data on effects of craniofacial surgery. There are five major areas of study relating to craniofacial anomalies. The psychosocial component of this program project is relatively minor and includes two specific projects.

Psychosocial Project I:

This porject attempts to document the impact of craniofacial deformity and its surgical correction on the psychosocial functioning of these patients. A specific objective is to evaluate the impact of deformity on patients' intellectual functioning and to learn if corrective surgery leads to improved intellectual functioning.

The research is intended to determine whether there is a significant relationship between measures of perceived degrees disfigurement and patterns of performance on standardized tests of intellectual functioning. The protocol includes

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serial psychometric testing at two year intervals on the child patient population from the New York University Center for Craniofacial Anomalies. A control group also receives comparable serial testing.

Psychosocial Project II:

Goals are to explore pre- and post-treatment interrelations of the parents' and child's coping style, social functioning and level of self esteem, perception of social rejection, and level of family communication about the problems resulting from the stigmata. The relationship of these variables to age, sex, ethnic groups, type of craniofacial syndrome and severity of deformity are examined.

The study includes all new families entering the clinic program. Family members complete psychometric tests and are interviewed; they will be examined in two years to evaluate changes following surgical treatment.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Interdisciplinary Studies: Clefts and Other Anomalies

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Herbert K. Cooper, D.D.S., D.Sc.
Lancaster Cleft Palate Clinic
24 North Lime Street
Lancaster, Pennsylvania 17602

PROJECT NUMBER: P01 DE-02172

PROJECT PERIOD: 10/64 - 12/77

PURPOSE:

The overall goal of this multidisciplinary longitudinal research effort was to identify the best treatment program for the total habilitation of patients with oral facial-communicative disorders using the expertise of a group of specialists from surgery, dentistry, speech, and hearing, medicine, pediatrics, education, mathematics, electronics, orthodontics, prosthodontics, psychology, social work, human genetics, computer science and other disciplines.

METHODS AND FINDINGS:

A wide range of projects related to the psychosocial aspects of children and adults with cleft lip and/or palate and their families were undertaken as part of the larger research program. Some of those specific projects and their subsequent findings were:

(1) In the study of infants, the Cattell data indicated that their overall development is essentially normal, but expressive language skills developed more slowly than other skills. The patient group on Bayley infant tests were found to be more passive than the controls.

(2) In a cross-sectional study, children with CL/P 7-14 years of age were compared with similar aged siblings. No significant difference in verbal or non-verbal intelligence was found but the children in the patient group

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were significantly lower on reading achievement than their siblings.

(3) Teenagers with facial clefts are less physically aggressive but equal in self-esteem in comparison with other adolescents. An extremely favorable attitude toward clefting is associated with positive social functioning whereas the reverse is also true.

(4) Data gathered on the social functioning of adults with CL/P ages 24-54 years and their non-cleft siblings and randomly-selected unrelated non-cleft controls yielded the following results:

Differences were observed in the proportion married, age at first marriage, number of children born, and frequency of divorce, between the cleft group, siblings and controls. The patient group married significantly later with proportionably fewer cleft lip and palate males marrying.

PUBLICATIONS:

Krogman, W. M.: Craniofacial Growth and Development: Appraisal. Journal Am. Dent. Assoc. 87:1037-1043, 1973.

Peter, J. P. and Chinsky, R. R.: Sociological aspects of cleft palate adults: II Education. Cleft Palate J. 11:443-449, 1974.

Peter, J. P., Chinsky, R. R., and Fisher, M. J.: Sociological aspects of cleft palate adults: III Vocational and economic aspects. Cleft Palate J. 12:193-199, 1975.

Peter, J. P., Chinsky, R. R., and Fisher, M. J.: Sociological aspects of cleft palate adults: IV Social integration. Cleft Palate J. 12:304-310, 1975

Peter, J. P. and Chinsky, R. R.: Sociological aspects of cleft palate adults: I Marriage. Cleft Palate J. 11:295-309, 1977.

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Starr, P., and Heiserman, K.: Factors associated with missed appointments of patients in a cleft lip and palate clinic. Cleft Palate J. 12:461-464, 1975.

Starr, P., Chinsky, R., Canter, H., and Meier, J.: Mental, motor and social behavior of infants with cleft lip and/or palate. Cleft Palate J. 14:140-147, 1977.

Starr, P., and Heiserman, K.: Acceptance of disability by teenagers with oral-facial clefts. Rehab. Counseling Bull. 20:198-201, 1977.

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PROJECT TITLE: A Research Program in Craniofacial Problems

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Edward J. Forrest, D.D.S., Ph.D.
Office of Research
University of Pittsburgh
Pittsburgh, Pennsylvania 15260

PROJECT NUMBER: P01 DE/NS-01697

PROJECT PERIOD: 10/62 - 2/81

PURPOSE:

This longitudinal interdisciplinary program was designed to investigate a variety of major issues related to craniofacial problems. Psychosocial aspects of the functioning of children and adults with cleft palate were included within this comprehensive program project.

METHODS AND FINDINGS:

A major research focus has been the longitudinal and cross-sectional description of a population of individuals with cleft palate and no other associated major anomalies. The cleft types were: incomplete of secondary palate (37 percent); complete of secondary palate (16 percent); bilateral complete of primary and secondary palate (13 percent); and unilateral complete of primary and secondary palate (34 percent).

Children were examined monthly during the first six months of life and at least bi-monthly thereafter. To assess overall development observations were done and batteries of tests (e.g., intelligence, speech and language tests) were administered. For some patients follow-up data were also obtained on various indices of social functioning, e.g., school performance, marital and vocational status.

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Most of the children with cleft palate were well within normal limits in mental and motor development. Some deficits in speech and expressive language, but not in receptive language were noted. A variety of materials to assist in the speech development, social development, and counseling of cleft palate patients and their families were developed and are described.

PUBLICATIONS:

Ebert, P.R., McWilliams, B.J. and Woolf, G.: A comparison of the written language ability of cleft palate and normal children. Cleft Palate J. 11:17-20, 1974.

Gluck, M.R., Wylie, H.L., McWilliams, B.J., and Conkwright, E.A.: Comparison of clinical characteristics of children with cleft palates and children in a child guidance clinic. Perceptual Motor Skills 21:806, 1965.

Irwin, E.C. and McWilliams, B.J.: Parents working with parents: the cleft palate program. Cleft Palate J. 10:360-366, 1973.

Irwin, E.C. and McWilliams, B.J.: Play therapy for children with cleft palates. Children Today 3:18-22, 1974.

McWilliams, B.J.: Psychosocial development and modification. Am. Speech & Hearing Assoc. Rpts. No. 5, 1970.

McWilliams, B.J. and Paradise, L.: Educational, occupational, and marital status of cleft palate adults. Cleft Palate J. 10: 223-229, 1973.

McWilliams, B.J. and Musgrave, R.H.: Psychological implications of articulation disorders in cleft palate children. Cleft Palate J. 9:294-303, 1972.

McWilliams, B.J.: Clinical use of the Peabody picture vocabulary test with cleft palate preschoolers. Cleft Palate J. 11:439-442, 1974.

Smith, R.M. and McWilliams, B.J.: Cleft palate and creativity. Medical Tribune 7:24, 1965.

Smith, R. M. and McWilliams, B.J.: Creative thinking abilities of cleft palate children. Cleft Palate J. 3:275, 1966.

Smith, R.M.: Psychosocial problems related to speech and language development. In Grabb, Rosenstein and Bzoch (Eds.): Cleft Lip and Palate, 1968.

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Smith, R.M. and McWilliams, B.J.: Psycholinguistic abilities of children with clefts. Cleft Palate J. 5:238, 1968.

Smith, R.M. and McWilliams, B.J.: Psycholinguistic considerations in the management of children with cleft palate. J. Speech Hear. Dis. 33:26, 1968.

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Tisza, V.B., Irwin, E. and Zabarenko, L.: A psychiatric interpretation of children's creative dramatics stories. Cleft Palate J., Vol. 6, No. 3, 1969.

Tisza, V.B., Irwin, E. and Scheide, E.: Children with oral-facial clefts: a study of the psychological development of handicapped children. J. Amer. Acad. of Child Psychiat., 1972.

Wylie, H.L. and McWilliams, B.J.: Guidance materials for parents of children with clefts. Cleft Palate J. 2:123, 1965.

Wylie, H.L., Feranchak, P. and McWilliams, B.J.: Characteristics of children with speech disorders seen in a child guidance center. Perceptual Motor Skills 20:1101, 1965.

Wylie, H.L. and McWilliams, B.J.: Mental health aspects of cleft palate: a review of the literature intended for parents. ASHA 8:31, 1966.

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PROJECT TITLE : Psychological Implications of Dentofacial Malocclusion

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Lee W. Graber, D.D.S., M.S.
and
G. William Lucker, Ph.D.
Center for Human Growth and Development
University of Michigan
Ann Arbor, Michigan 48109

PROJECT NUMBER: RO1 DE-05095

PROJECT PERIOD: 1/79 - active

PURPOSE:

The primary objective of the project is to relate societal evaluations of facial physical appearance to accepted morphological standards with the intent of identifying relationships relevant to orthodontic practice.

METHODS AND FINDINGS:

The study is divided into three major components: 1) detection and assessment of malocclusion; 2) attitudes concerning malocclusion; 3) behavioral effects of malocclusion. A variety of psychological and dental measurements and tests are being utilized. The research population includes a random sample of 250 males and 250 females, aged ten to thirteen, and a similar sample aged eighteen to twenty-five. Included within this group are a range of malocclusion types from "normal" to "severely maloccluded".

PUBLICATIONS:

Graber, L.W. and Lucker, G.W.: Dental esthetic self-evaluation and satisfaction. Am. J. of Orthod. 77(2):163-172, 1980.

Lucker, G.W. and Graber, L.W.: Physiognomic features and facial appearance judgments in children. J. of Psychol. 104:261-268, 1980.

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PROJECT TITLE: Diagnostic and Prognostic Techniques in Cleft Palate

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Hughlett L. Morris, Ph.D.
Department of Otolaryngology
School of Dentistry
University of Iowa
Iowa City, Iowa 25542

PROJECT NUMBER: P01 DE-0853

PROJECT PERIOD: 6/76 - Active

PURPOSE:

The goal of the project is to identify and to evaluate diagnostic and prognostic techniques in cleft palate management. Some psychosocial variables are included in baseline and longitudinal data obtained in this project.

Also within this project there has been an attempt to study cognitive and educational problems demonstrated by children with cleft lip and palate.

METHODS AND FINDINGS:

Behavioral findings from this long-term program project include the following:

(1) Children with cleft lip and palate show lower than normal achievement on basic skills tests. When compared to normal children, they are rated by teachers as demonstrating significantly greater inhibition of impulse (internalizing behavior).

(2) Cleft palate specialists are inconsistent in what they expect families to know about clefts and in their counseling routines. Mothers generally have appropriate information but predict that the child knows more about

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cleft and cleft management than is actually the case.

(3) Facial disfigurement of children with cleft lip and palate appears to affect teachers' ratings. Teachers rate intellectual ability of cleft children with more noticeable disfigurement less accurately than cleft children with relatively normal appearance. For the group with more noticeable disfigurement, teachers underestimated the ability of brighter children.

(4) Teachers view cleft lip and palate children as significantly more inhibited in the classroom than parents observe at home.

PUBLICATIONS:

Richman, L.C.: Behavior and achievement of cleft palate children. Cleft Palate J. 13:4-10, 1976.

Richman, L.C.: The effects of facial disfigurement on teachers' perception of ability in cleft palate children. Cleft Palate J. 15:155-160, 1978A.

Richman, L.C.: Parents and teachers: differing views of behavior of cleft palate children. Cleft Palate J. 15:360-364, 1978B.

Richman, L.C. and Harper, D.C.: School adjustment of children with observable disabilities. J. of Abnormal Child Psychology. 6:11-18, 1978.

Richman, L.C. and Harper, D.C.: Observable stigmata and perceived maternal behavior. Cleft Palate J. 15:215-219, 1978.

Walesky-Rainbow, P.A. and Morris, H.L.: An assessment of information counseling for cleft palate children. Cleft Palate J. 15:20-29, 1977.

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PROJECT TITLE: Psychosocial Evaluation of Craniofacial Patients

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Michael Pertschuk, M.D.
Center for Behavioral Medicine
Department of Psychiatry
University of Pennsylvania
Philadelphia, Pennsylvania 19104

PROJECT NUMBER: R01 DE-05371

PROJECT PERIOD: 2/81 - active

PURPOSE:

The five goals of the study are: 1) to determine the psychosocial status of subjects with craniofacial anomalies, 2) to determine if surgery alters the course of psychosocial adjustment, 3) to determine if changes in appearance are correlated with changes in psychosocial functioning, and if psychosocial adjustment correlates with appearance in both individuals with craniofacial anomalies and non-malformed comparison subjects, 4) to determine whether post surgery measures of adjustment are correlated with initial measures of adjustment and 5) to study whether psychosocial or social adjustment is correlated with patterns of family functioning.

METHOD AND FINDINGS:

The study group will include forty-nine children aged 7-13 scheduled for craniofacial surgery for congenital anomalies. All of these children will be operated on at the University of Pennsylvania Department of Plastic Surgery and all will have IQ's in the normal range. Data collected from these children will be compared to data collected from two comparison groups: 50

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children undergoing thoracic surgery for congenital heart anomalies, and 50 healthy children. Both groups will be matched for age, sex, IQ (Ravens Progressive Matrices) and socio-economic status to subjects in the craniofacial group.

A series of pre- and post surgery evaluations will be conducted. All children will complete the State Trait Anxiety Scale, the Piers-Harris Children's Self-Concept Scale, the Ravens Matrices, and the Childhood Experience Questionaire. The Missouri Behavior Checklist, Moos Family Environment Scale and Childhood Experience Questionnaire will be completed by parents; a pupil behavior rating scale will be completed by the patient's teacher. Attendance records, transcripts and records of disciplinary problems will be obtained from school records.

Parents and patients will be interviewed to obtain an overview of functioning and family life, demographic information and a Social Relations Survey. In addition, an index of attractiveness will also be obtained based on ratings of photographs by four independent judges.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: A Study of Growth of Normal and Abnormal Faces

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Robert E. Shaw, Ph.D.
Department of Psychology
University of Connecticut
Storrs, Connecticut 06286

PROJECT NUMBER: RO1 DE-04990

PROJECT PERIOD: 3/79 - active

PURPOSE:

The long range research goal is identification of the physical, biological, and psychological determinants underlying the perception of the growing and aging human face.

The project aims are:

(1) To determine how a growing or aging face is perceived, ultimately establishing which factors specify age, race, sex, attractiveness, family resemblance, and individual identity.

(2) To incorporate the perceptual information into a computer graphics system with extensive biological and psychological validation.

(3) To develop subprograms for predicting growth, aging, and treatment effects that might be made part of the treatment planning process.

(4) To use the model as a research tool for studying visual perception of events.

METHODS AND FINDINGS:

The research shows that a particular mathematical transformation, when applied to a human head, is perceived as growth and closely predicts the actual craniofacial morphology

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resulting from growth. This growth model is being incorporated into a system of computer graphics for simulating the interactions of cosmetic treatment with growth and aging of the craniofacial complex.

PUBLICATIONS:

Alley, T.R.: Infantile colouration as an elicitor of caretaking behaviour in old world primates. Primate, Vol. 21:416-429, 1980B.

Mark, L.S., Pittenger, J.B., Hines, H., Carello, C., Shaw, R.E., and Todd, J.T.: Wrinkling and head shape as coordinated sources of age-level information. Perception & Psychophysics 27:117-124, 1980.

Mark, L.S., Todd, J.T., and Shaw, R.E.: The perception of growth: A geometric analysis of how different styles of change are distinguished. Human perception and performance. J. of Exp. Psych (In press).

Pittinger, J.B., Shaw, R.E., and Mark, L.S.: Perceptual information for the age level of faces as a higher order invariant of growth. Human perception and performance. J. of Exp. Psych 5:478-493, 1979.

Todd, J.T., Mark, L.S., Shaw, R.E., and Pittenger, J.B.: The perception of human growth. Sc. Amer. 242:106-114, 1980.

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PROJECT TITLE: Behavioral Stages for Cleft Palate Patients

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Philip Starr, M.S.W.
Department of Social Research
H K Cooper Institute
Lancaster, Pennsylvania 17602

PROJECT NUMBER: RO1 DE-04779

PROJECT PERIOD: 1/78 - active

PURPOSE:

The overall objective of the longitudinal study is to contribute to the knowledge of the behavioral functioning of patients with cleft lip and/or palate (CL/P), and to provide information of value to clinicians in their treatment of the patient and supportive work with the family.

METHODS AND FINDINGS:

Data is being collected from parents of patients with CL/P at two, four, six, ten and fifteen years of age as well as from young adults (24-30 years). Each of these ages represent significant stages of psychosocial development. Familial behavioral and attitudinal data is also being collected at each age period. These data are being compared by age, sex and family social-economic status, with comparison groups of normal children randomly selected from pediatricians' practice and public schools. Control subjects are matched for age, sex and social economic status. Statistical analysis are done to determine whether significant differences exist and to define the nature of differences. Cleft type differences are also being examined.

These studies permit development of norms for behavior of patients with cleft lip and/or palate which can serve as "yardsticks" for clinicians in their management of patients.

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Currently available findings are as follows:

The Two-Year Old Group:

- The two year old children with CL/P were rated by their mothers as having more somatic complaints than noncleft children.

- There were no significant differences for the two groups of mothers in relation to parenting behavior or marital adjustment.

- Happily-married mothers, when compared with the least happily-married mothers, rated their children as less aggressive, less active, less inhibited and having less sleep disturbance.

The Ten-Year Old Group:

- There were no significant differences between the cleft and noncleft groups.

The Young Adult Group:

- Young adult patients with CL/P were found to be less educated, hold lower occupational status, have achieved a lower socioeconomic status, and are less likely to be married than the noncleft comparison group.

- Findings indicated that females with cleft lip and palate are the most disadvantaged subgroup within the patient group.

PUBLICATIONS:

Starr, P.: Hospitalization effects upon behavior of pre-schoolers with cleft lip and/or palate: A pilot study. Cleft Palate J. 15: 182-185, 1978.

Starr, P.: Cleft Lip and/or Palate: Will It Affect My Child?, Lancaster Cleft Palate Clinic, Lancaster, Pa., 1978.

Starr, P.: Self-esteem and behavioral functioning of teen-agers with oral-facial clefts. Rehab. Lit., Vol. 39:233-235, 1978.

Starr, P. and Pannbacker, M.: Identification of Significant Issues by Parents of Children with Cleft Lip and/or Palate, Lancaster Cleft Palate Clinic, Lancaster, Pa., 20 pages, 1978.

Starr, P., Drewes, L., and Alicea, M.: Our Child With A Cleft Lip and Palate, Lancaster Cleft Palate Clinic, Lancaster, Pa., 1978.

Starr, P. and Heiserman, K.: The Social Worker in a Cleft Palate Clinic. In Cooper, H.K., Harding, R.L., Krogman, W.M., Mazaheri, M., and Millard, R.T. (Eds.): Cleft Palate and Cleft Lip: A Team Approach to Clinical Management and Rehabilitation of the Patient, Philadelphia, W.B. Saunders, pp. 498-519, 1979.

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Starr, P. and Oppenheimer, M.: A social factors survey of a cleft palate clinic. Plast. and Reconst. Surg. 64, 253, 1979.

Starr, P., Pannbacker, M., and Lass, N.J.: Information and experiences with cleft palate: Students, parents and professionals. Cleft Palate J. 16(2):198-205, 1979.

Starr, P. and Pearman, W.A.: Social functioning of young adults with cleft lip and/or palate. J. of Penn. Speech and Hear. Assoc. 12:3-7, 1979.

Starr, P.: Facial attractiveness and behavior of patients with cleft lip and/or palate. Psych. Rep. 46:579-582, 1980.

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PROJECT TITLE: Psychological and Radiographic Evaluations of the Orthognathic Surgery Patient

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

James B. Sweet, D.D.S.
Clinical Dental Services Section
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: ZO1 DE-00213

PROJECT PERIOD: 1979 - active

PURPOSE:

Many individuals with middle and lower facial bony deformities or severe malocclusion require surgical correction in addition to routine orthodontic treatment. The preoperative psychological state of these patients is influenced by their facial appearance, functional disability, and by expected postsurgical changes.

Specific aims of this study are: 1) to establish the psychological impact of the deformities prior to surgery, 2) to determine the expectations from surgery, and 3) to examine the relationships between these variables after a two year follow-up period. Postoperation changes in facial bone and tooth positions which may occur are also being examined.

METHODS AND FINDINGS:

Study subjects are patients between 15 and 45 years of age who have malocclusions that can be corrected by surgery, or a combination of surgery and orthodontics. Preoperative photographs, study models and panoramic and cephalometric radiographs are taken on each patient. Preoperatively, each patient and a family member is interviewed by a psychiatrist. Personality variables are assessed

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by standard psychological tests, and preoperative expectations are assessed by a questionnaire.

At three months, 12 months, and 24 months following surgery, psychological tests are readministered and the patient is reinterviewed by the psychiatrist. At this time, resolution of presurgical expectations and overall satisfaction of the procedure will be determined. Panoramic and cephalometric radiographs, study models, and facial photographs will be taken at the three, six, 12 and 24 month intervals to assess postoperative stability. At completion of the study, a final evaluation and comparison of the results will be done using conventional biostatistical methods.

To date, 22 subjects have been accepted for the study. Six of these cases have not started treatment and eleven have completed their final two-year evaluation. No results are yet available due to the small number of completed cases.

PUBLICATIONS:

Not yet available.

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B. IMPACT OF ORAL HEALTH, DISEASES, CONDITIONS AND TREATMENTS

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PROJECT TITLE: Dental Disease and Work Loss

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Susan Reisine, Ph.D.
Department of Behavioral Sciences and Community Health
School of Dental Medicine
University of Connecticut
Farmington, Connecticut 06032

PROJECT NUMBER: R23 DE-5497

PROJECT PERIOD: 8/80 - active

PURPOSE:

This study examines relationships between dental disease and work loss in a stratified sample of the adult population in Hartford, Connecticut. Specific objectives are: 1) to measure the incidence of dentally-related work loss, 2) to define sociodemographic factors associated with work loss due to dental problems, 3) to classify the types of dental problems responsible for work loss, and 4) to compare the incidence of dentally-related work loss to other causes of work loss.

METHODS AND FINDINGS:

A prospective panel research design is used to measure incidence and changes in rates of dental disability over time. A cohort of employed persons will be followed for a one-year period with telephone surveys every three months. The population to be sampled is defined as all households with at least one member employed full-time in the Hartford, Connecticut Standard Metropolitan Statistical area. A random digit dialing procedure is used and approximately 4800 individuals will be followed over a one-year interval. Incidence of work loss days per person on a quarterly and annual basis will be estimated separately for oral conditions, other health conditions, and non-health conditions.

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This project was recently initiated and findings are not yet available.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Development of Behavioral Measures of Oral Health Status

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Susan Reisine, Ph.D.
Department of Behavioral Sciences and Community Health
School of Dental Medicine
University of Connecticut
Farmington, Connecticut 06032

PROJECT NUMBER: K04 DE-00100

PROJECT PERIOD: 2/81 - active

PURPOSE:

This project includes a series of studies identifying the social-behavioral consequences of oral diseases. Initially, the investigator will analyze the impact of oral conditions or diseases on work loss. Subsequent studies will be concerned with 1) developing and evaluating measures of perceived oral health status, and 2) identifying social-behavioral determinants of dental service utilization.

METHODS AND FINDINGS:

Telephone interviewing techniques will be used to derive information in a study of perceived oral health status. Respondents will rate their overall oral health and the conditions of their teeth, gums and occlusion. They will also respond to specific questions related to oral function, social functioning, dental experiences, and sociodemographic, attitudinal, and cognitive characteristics. The analysis initially will be descriptive with the goal of identifying those elements of social and oral

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function that are most important in determining perceived oral health status.

PUBLICATIONS:

Not yet available.

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C. BEHAVIORAL ASPECTS OF DENTALLY-RELEVANT PHYSIOLOGICAL FUNCTIONS

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PROJECT TITLE: Dental/Orofacial Pain --- Mechanisms, Behavior, and Modulation

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

John J. Bonica, M.D., D.Sc.
Department of Anesthesiology
School of Medicine
University of Washington
Seattle, Washington 98195

PROJECT NUMBER: P01 DE-5130

PROJECT PERIOD: 7/78 - active

PURPOSE:

Overall aims of this multidisciplinary program project are 1) to gain new information about pain and its mechanisms, 2) to provide this information promptly to physicians and dentists, thereby improving patient management. Though support had initially been requested for eight separate projects and core administrative support allowing participation of visiting scientists, sponsorship of seminars and conferences, etc., funding limitations required reducing the scope of the program project.

Currently, two research projects are supported through this program project: "Dental Near and Far-Field Potentials and Pain Reactivity", (Willie K. Dong, Ph.D., Principal Investigator); "Acute Pain in Research and Clinical Settings" (Samuel F. Dworkin, Ph.D., D.D.S., Principal Investigator). In addition, the program project has stimulated weekly multidisciplinary meetings of pain scientists, regular seminars on various aspects of pain, meetings with visiting pain scientists, and an annual symposium.

METHODS AND FINDINGS:

Dr. Dong's research is studying the origins of trigeminal near and far-field evoked potentials in anesthetized animals, and evaluating specific changes in near and far-field evoked responses in

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relation to changes in escape behavior or "pain" reactivity. Effects of selective cortical and brain stem lesions on the threshold, latency, and force of escape responses evoked by trigeminal stimulation are being assessed. The experimental design used should permit detailed contrast of changes in near and far-field responses to noxious trigeminal stimulation with assessment of behavioral response within the same animal at the same point in time. These studies are anticipated to lead to the identification of sites underlying transmission and processing of signals resulting from noxious trigeminal stimulation. Results obtained from these electrophysiological and behavioral studies should help delineate cortical and brain stem sites important to orofacial pain.

The overall objective of Dr. Dworkin's project is to study similarities and differences in pain behavior in clinical versus research laboratory settings. Initial research studies have involved cognitive interventions and pain behavior. A completed study demonstrated that nitrous oxide in concentrations of 33 1/3% can, under the appropriate cognitive context, significantly enhance pain sensitivity. This (contra-intuitive) finding is being tested in a study currently under progress, in which nitrous oxide in various concentrations is administered to subjects under several cognitive contexts to determine whether the quality and quantity of information provided to subjects modified their pain behavior. In addition, a series of single subject studies have employed hypnosis as the sole anesthetic for patients undergoing oral surgery and other surgery. In these experiments, the experimenters observed directly shifts in cerebral hemisphere

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functioning as measured by power spectrum analysis of the EEG. Preliminary results indicated a total power reduction in EEG output and laterality shifts from left to right dominance in cerebral hemisphere power outputs as a subject was hypnotized, experienced invasive oral surgical procedures and then was reawakened. Efforts to replicate this finding with other subjects are in progress.

Additional studies are testing the limits of the ability of cognitive interventions to modify pain behavior in interaction with varying dosages of nitrous oxide. Cognitive variables to be manipulated will be expectancy, information and suggestion. Treatment settings will be both the clinical operatories of the University of Washington Dental Clinics and the Pain Research Laboratory. Other studies will manipulate the same cognitive and contextual variables to observe effects on pain tolerance levels, as analyzed by conventional parametric statistics and signal detection theory.

PUBLICATIONS:

Chen, A. and Dworkin, S.: Cortical power spectrum analysis of hypnotic pain control in surgery. Internat. Jour. of Neuroscience. (In press).

Chen, A. and Dworkin, S.: Human pain and evoked potential: possible assessment of headache with endogenous brain potentials triggered by R-waves of EKG in pain patients. Proceedings of the International Symposium on Clinical Applications of Evoked Potentials in Neurology. (In press).

Chen, A. and Dworkin, S.: Cognitive synergism of pharmacological analgesia: a new focus for analgesic treatment. Proceedings of Inter. Assoc. for the Study of Pain, 1981 (abstract).

Dworkin, S., Chen, A. and Schubert, M.: Expectancy, nitrous oxide, and modification of pain in a clinical setting. Proceedings of Inter. Assoc. for the Study of Pain, 1981 (abstract).

Dworkin, S. and Chen, A.: Cognitive modification of pain by varying context, expectation, information, and suggestion. Proceedings of Inter. Assoc. for the Study of Pain, 1981 (abstract).

Dworkin, S. and Chen, A.: Pain micro-computer system (PMS). Proceedings of Inter. Assoc. for the Study of Pain, 1981 (abstract).

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Dong, W. K.: Origins of trigeminal far-field and near-field evoked potentials in the cat. Proceedings of the 3rd Congress on Pain (IASP), Edinburgh, Scotland, 1981 (abstract).

Byers, M. R. and Dong, W. K.: Autoradiographic demonstration of sensory nerve ending in monkey teeth. Proceedings of the 3rd Congress on Pain (IASO) Edinburgh, Scotland, 1981 (abstract).

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PROJECT TITLE: Studies of Sensorimotor Impairments of the Mouth and Pharynx

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

James F. Bosma, M.D.
Clinical Investigations Branch
Oral and Pharyngeal Development
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00182

PROJECT PERIOD: 1975 - active

PURPOSE:

This is a descriptive study of clinical variations associated with malformations or with neurological impairments of the mouth or pharynx. Studies are directed toward defining anatomical and sensorimotor abnormalities and their physiological correlates, as well as devising and applying therapies for disabilities of feeding and of speech and other respiratory functions.

METHODS AND FINDINGS:

Standard procedures of cinephotography and cineradiography, as well as acoustical and other physiological recordings are employed. The regional performances of feeding, speech and other respiratory actions are described in infants, children and adults. Selected patients having sensory disorders of the oral and pharyngeal regions are also evaluated by sensory testing. Patients who have surgical excision for cancer are studied as examples of the modification of sensory input by ablation.

Adaptations of selected diagnostic methods, including sensory evaluation, have enhanced the definition of sensorimotor disorders of the mouth, pharynx and larynx. This has contributed to the recognition of related elements of separate disorders, to

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anticipation of some impairments in progressive diseases, and to therapy of disorders which are shown to have common pathogenic mechanisms.

PUBLICATIONS:

Bosma, J.F.: Physiology of the Mouth. In M.M. Paparella and D.A. Shumrick (Eds.): Otolaryngology, Philadelphia, Saunders Co., 1980, 2nd Ed.

Bosma, J.F. and Donner, M.: Physiology of the Pharynx, ibid.

Bosma, J.F. and Donner, M.: Radiography of the Pharnyx, Springer-Verlag, 1981. (In press).

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PROJECT TITLE: Neural Correlates of Behavior in the Monkey Medullary Dorsal Horn

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

M. Catherine Bushnell, Ph.D.*
Ronald Dubner, D.D.S., Ph.D.*
Neurobiology and Anesthesiology Branch
Neural Mechanisms Section
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00291

PROJECT PERIOD: 1979 - active

PURPOSE:

These studies are characterizing behavioral modulatory influences on sensory neurons that relay information about noxious stimuli and thus could participate in the perception of and response to oral-facial pain.

METHODS AND FINDINGS:

Rhesus monkeys were trained to detect the termination of innocuous heat stimuli and the onset of noxious heat stimuli. In a second task, the same monkeys detected the onset of a light stimulus.

Neurons that responded to passive noxious mechanical and thermal stimulation also responded to other stimuli the monkey used for successful completion of a task. These task-related responses occurred to visual or thermal stimuli that predicted availability of reward. Neurons that reliably coded intensity of noxious thermal stimuli generally showed only small task-related responses, while neurons with large task-related responses often had imprecise sensory properties. Both types of neurons projected to the thalamus. These task-related responses may modulate sensory activity and thereby influence the perception of

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and response to oral-facial pain.

PUBLICATIONS:

Dubner, R.: Peripheral and central mechanisms of pain. In: Pain, Discomfort and Humanitarian Care, edited by L.K.Y. Ng and J.J. Bonica, Elservier, North-Holland, Amsterdam, 1980, p. 61-82.

Dubner, R. Hoffman, D.S., and Hays, R.L.: Neural correlates of behavior in the monkey medullary dorsal horn. In Y. Kawamura and R. Dubner (Eds.): Oral-Facial Sensory and Motor Functions, Quintessence, Tokyo. (In press).

Dubner, R. and Hayes, R.L.: Pain mechanisms in the trigeminal system. In: Mechanisms of Pain and Analgesic Compounds, edited by R.F. Beers, Jr., and E.G. Bassett. Raven Press, New York, 1979, pp. 157-169.

Dubner, R., Hayes, R.L. and Hoffman, D.S.: Neural and behavioral correlates of pain in the trigeminal system. In: Pain, edited by J.J. Bonica, Raven Press, New York, 1980, pp. 63-72.

Hayes, R.L., Price, D.D. and Dubner, R.: Behavioral and physiological studies of sensory coding and modulation of trigeminal nociceptive input. In: Advances in Pain Research and Therapy, Vol. 3., edited by John J. Bonica, et al, Raven Press, New York, 1979, pp. 219-243.

* This is a continuation of project number ZO1 DE-0151. Principal Investigators during earlier phases of this project were Ronald L. Hayes and Donna S. Hoffman.

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PROJECT TITLE: Neurosensory Deficits in Craniofacial Anomalies

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Frank A. Catalanotto, Ph.D.
Department of Pediatric Dentistry
School of Dental Medicine
University of Connecticut
Farmington, Connecticut 06032

PROJECT NUMBER: R23 DE-4130

PROJECT PERIOD: 3/75 - 3/78

PURPOSE:

The overall purpose stated by the investigators was to improve understanding of the role of neural processes in craniofacial growth and development. Subjects with cleft lip or palate were compared with normal siblings on a battery of motor-sensory, physiologic, anatomic, and psychometric measures. A subproject within this study evaluated whether lingual and or oral sensation could be altered in patients with cleft lip or palate.

METHODS AND FINDINGS:

Tests were performed upon patients having cleft lip and palate, and with normal controls. Taste thresholds for table salt, sugar, lactose, hydrochloric acid, quinine sulfate, and propylthiouracil were ascertained by the forced-choice, three-drop method. Olfaction was tested with pyridine, thiophene and nitrobenzene. Touch was evaluated with graded hairs, a two-point discrimination tester, and a stereognostic test. Radiographs were taken, study charts of dental arches made, and intelligence tests were given.

Overall, differences between cleft lip/palate subjects and normal controls appeared in the study to be minimal for the measures used.

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PUBLICATIONS:

Derkson, G.D. and Catalanotto, F.A.: The lateral tongue reflex in human neonates. Percept. Mot. Skills 46:331-337, 1978.

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PROJECT TITLE: Acupuncture and Perception of Dental Pain in Man

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

C. Richard Chapman, Ph.D.
Department of Anesthesiology
School of Medicine
University of Washington
Seattle, Washington 98195

PROJECT NUMBER: R01 DE-04004

PROJECT PERIOD: 3/75 - active

PURPOSE:

Purposes are: to determine the effects of acupuncture on human perception of pain; to develop evoked potential methodology for the investigation of dental pain and analgesia; to study electrical stimulation analgesia and its effects on cerebral evoked-responses to dental pain; to explore the possible relationship of stimulation-induced analgesia to natural endorphins using both psychophysical and evoked potential methods; and to contrast the analgesia caused by acupuncture with that produced by nitrous oxide, opiate drugs, and aspirin.

METHODS AND FINDINGS:

Constant-current stimulation of intact teeth is used to generate pain data, which is assessed using sensory decision theory and category scaling.

Discriminative ability for painful stimulation decreases with age in both sexes. Electrical acupuncture of hands, transcutaneous electrical stimulation of the hands, and 33% nitrous oxide all reduce discriminative ability and also produce changes in labeling behavior (criterion, response bias). Placebo

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electric acupuncture only changes the criterion responses. Acupuncture in the trigeminal area causes reduced perception of dental pain but did not produce changes in attitude toward pain.

Evoked potential amplitudes and subjective pain judgments are both reduced by acupunctural stimulation. The effect of facial acupuncture is essentially the same as that of acupuncture at a meridian point in the hands. However, neither of these analgesic changes is reversed when naloxone, a narcotic antagonist, is injected. Since these findings contradict the outcomes of pain threshold studies by others, the role of endorphins in acupuncture analgesia must be considered an issue requiring further investigation.

PUBLICATIONS:

Chapman, C.R.: Some pitfalls in the psychophysical assessment of drug effects: Another look at the effects of diazepam on pain threshold. Br. J. Anaesth. 47:640-642, 1975.

Chapman, C.R., Gehrig, J.D., and Wilson, M.E.: Acupuncture analgesia in experimental pain: Comments on the Clark and Yang report. Science 189(4196):65, 1975.

Chapman, C.R., Wilson, M.E., and Gehrig, J.D.: Acupuncture compared with 33% nitrous oxide for dental analgesia: A Sensory Decision Theory evaluation. Anesthesiology 42:532-537, 1975.

Chapman, C.R., Wilson, M.E., and Gehrig, J.D.: Comparative effects of acupuncture and transcutaneous stimulation on the perception of painful dental stimuli. Pain 2:265-284, 1976.

Chapman, C.R.: Psychological evaluation of acupuncture analgesia: Some issues and considerations. (Editorial Views) Anesthesiology 43:501-506, 1975.

Chapman, C.R., Gehrig, J.D., and Wilson, M.E.: Acupuncture analgesia in experimental pain: Comments on the Clark and Yang report. Science 189(4196):65, 1975.

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Chapman, C.R., Gehrig, J.D., and Wilson, M.E.: Acupuncture, Pain and Signal Detection Theory. Science 189:65, (July 4) 1976.

Chapman, C.R., Wilson, M.E. and Gehrig, J.D.: Signal Detection evaluation of the effects of acupuncture on the perception of painful dental stimulation. In J.J. Bonica and D. Albe-Fessard (Eds.): Advances in Pain Research and Therapy, Vol. 1, New York, Raven Press, 1976, pp. 775-779.

Chapman, C.R.: Modulation de l'odontalgie experimentale chez d'hom par l'acupuncture et par la stimulation electrique transcutanee. Annales de l'anesthesiologie Francaise. Vol. 14, Ch. 5, 1978, pp. 427-433.

Chapman, C.R.: Contribution of research on acupunctural and transcutaneous electrical stimulation to the understanding of pain mechanisms and pain relief. In Beers, R.F., and Bassett, E.C. (Eds.): Mechanisms of Pain and Analgesic Compounds. New York, Raven Press, 1979, pp. 71-84.

Chapman, C.R. and Benedetti, C.: Nitrous oxide effects on cerebral evoked potential to pain: Partial reversal with a narcotic antagonist. Anesthesiology 51:135-138, 1979.

Chapman, C.R., Colpitts, Y.M., Benedetti, C., Kitaeff, R. and Gehrig, J.D.: Evoked Potential Assessment of Acupunctural Analgesia: Attempted Reversal with Naloxone. Pain, 9:183, 1980.

Chen, A.C.N., Chapman, C.R. and Harkins, S.W.: Brain evoked potentials are functional correlates of induced pain in man. Pain. 6(3):349-365, 1979.

Chapman, C.R. and Chapman, C.R.: Aspirin Analgesia Evaluated by Event-Related Potentials in Man: Possible Central Action in Brain. Exp. Brain Res. 39:359-364, 1980.

Harkins, S. W. and Chapman, C.R.: Detection and decision factors in pain perception in young and elderly men. Pain 2:253-264, 1976.

Harkins, S.W. and Chapman, C.R.: Discrimination of painful dental stimulation in younger and older women. J. Gerontol. (In press).

Martin, R.W. and Chapman, C.R.: Dental dolorimetry for human pain research: Methods and apparatus. Pain, 6:349-364, 1979.

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PROJECT TITLE: Role of Saliva in Human Taste Perception

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Carol M. Christensen, Ph.D.
Monell Chemical Senses Center
University of Pennsylvania
Philadelphia, Pennsylvania 19104

PROJECT NUMBER: RO1 DE/NS-5545

PROJECT PERIOD: 7/79 - 6/81

PURPOSE:

The overall research objective is to assess the impact saliva has on the perception of taste. One possible source of interaction between gustatory and non gustatory variables is saliva flow.

This research project has two specific objectives: 1) to identify gustatory, olfactory, tactile and thermal stimuli which influence salivary flow in humans, and 2) to evaluate the effects of salivary flow on taste thresholds, perceived taste intensities and taste preferences.

METHODS AND FINDINGS:

Taste recognition and detection thresholds and suprathreshold measures of perceived taste intensity and pleasantness were obtained from healthy human subjects during periods of both normal and reduced salivary flow. Decreases in salivary flow were produced by separately administering two different drugs, Elavil and Benadryl, which pilot studies showed significantly reduced salivary flow. Each subject was tested while both on and off the pharmacologic agents. The use of two different drugs permitted evaluation of changes in taste perception due to the drugs' reduction of salivary flow vs. taste changes produced by other specific

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drug-related actions. Neither threshold nor supra-threshold taste magnitude was shown at statistically reliable levels to depend on salivary flow-rate. The principal investigator suggests that this may have resulted from insufficient lowering of the salivary flow by Elavil and Benadryl.

In subsequent studies, atropine was administered and was found to reduce salivary flow rate more than 80% from resting levels. Threshold sensitivity to citric acid was significantly increased; taste responses to other compounds were unaffected. Overall, the series of studies suggest that large decreases in salivary flow, per se, have little impact on taste perception.

These experiments did reveal a relationship between taste sensitivity to NaCl, quinine and citric acid and individual patterns of salivary flow rate, which can vary more than 8-fold between individuals.

PUBLICATIONS:

Christensen, C.M.: Oral perception of solution viscosity. J. of Texture Studies 10:153-164, 1979.

Christensen, C.M.: Effects of taste quality and intensity on the oral perception of viscosity. Perception & Psychophysics 28: 315-320, 1980..

Christensen, C.M.: Effects of solution viscosity on perceived saltiness and sweetness. Perceptions & Psychophysics 28:347-353, 1980.

Christensen, C.M. and Vickers, Z.M.: Relationships of chewing sounds to judgments of food crispness. J. of Food Science, 1981. (In press).

Vickers, Z.M. and Christensen, C.M.: Relationships between sensory crispness and other sensory and instrumental parameters. J. of Texture Studies, 1981. (In press).

Christensen, C.M., Navazesh, M. and Brightman, V.J.: Drug-induced xerostomia and effects on taste perception. Amer. Assoc. for Dental Res., March 1981, Chicago, Ill. (Abstract)

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PROJECT TITLE: Sensations Produced by Tooth Pulp Stimulation

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Ronald Dubner, D.D.S., Ph.D.
Neurobiology and Anesthesiology Branch
Clinical Pain Section
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00245

PROJECT PERIOD: 1977 - 1981

PURPOSE:

The objective of this project is to determine the nature of sensations produced by tooth pulp stimulation. Non-pain, as well as pain sensations, are evoked when low intensity electric current is applied to human teeth. In order to assess the role of non-pain sensations in the pulp--a traditionally exclusive pain system, these sensations were studied both psychologically and physiologically: 1) the minimum levels of current necessary to produce non-pain and pain sensations were determined for different frequencies of stimulating current; 2) the intensities of sensations from detection threshold to pain threshold were scaled by magnitude production and by verbal descriptors; 3) electromyographic (EMG) activity of the masseter inhibitory period was recorded during tooth pulp stimulation at both non-pain and pain currents; 4) the effect of a narcotic on sensations produced by tooth pulp stimulation and on the masseter inhibitory period was evaluated; and 5) the effects of a conditioning electrical stimulus, applied to the tooth, on sensation and on masseteric inhibitory period were determined.

METHODS AND FINDINGS:

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Non-pain and pain sensations were produced by electrical stimulation delivered to the labial and the incisal edge of upper central incisors. Frequency of stimulation ranged from 5 to 500 HZ. Detection and pain thresholds were determined, and the intensities of sensations between these thresholds were scaled by magnitude production and by verbal descriptors.

Results show a wide range of non-pain sensations produced when the tooth pulp is stimulated electrically. Subjects are able to scale the intensities of these non-pain sensations, in addition to the pain sensations usually associated with tooth pulp stimulation. These scales or ratings may be used to assess the effects of various pain control methods and to determine if they act uniformly or differentially on non-pain sensations.

Electromyographic monitoring of masseter inhibitory activity (following chin tap) has been used as a diagnostic tool for assessing temporomandibular joint dysfunction (TMJ). This inhibitory period (following tooth pulp stimulation) has been used also as a nociceptive reflex, a physiological correlate for pain. However, the present results show that the inhibitory period often is not correlated with pain sensation. The inhibitory period may be used as an index of the current applied to an unanesthesized tooth, but not as a reliable index of pain.

PUBLICATIONS:

McGrath, P.A., Sharav, Y., Dubner, R. and Gracely, R.H.: Masseter inhibitory periods and sensations evoked by electrical tooth pulp stimulation. Pain. (In press).

* Principal Investigators during earlier phases of this project were Patricia A. McGrath, Ph.D. and Yair Sharav, D.D.S.

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PROJECT TITLE: Neuropharmacological Analysis of Supraspinal and Narcotic Modulation of Pain

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Ronald Hayes, Ph.D.
and
Ronald Dubner, D.D.S., Ph.D.
Neural Mechanisms Section
Neurobiology and Anesthesiology Branch
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00165

PROJECT PERIOD: 1975 - 1979

PURPOSE:

Overall objectives are to develop a more comprehensive behavioral model of pain in animals (primates) and to broaden our understanding of the analgesic action of narcotics. Specific aims are: 1) to develop a primate, behavioral model of pain in which the animal's response to noxious stimuli is primarily, if not totally, dependent upon the sensory (intensity) dimension of pain while independent of the affective dimension of pain, and 2) to test the hypothesis that narcotic analgesics (viz, morphine) can suppress the sensory (intensity) dimension of noxious heat stimuli.

METHODS AND FINDINGS:

Experiments evaluated the relative effects of morphine and diazepam on responses in a task requiring two male rhesus monkeys to attend to the sensory-intensity component of innocuous and noxious thermal stimuli. The animals had to concurrently perform two types of tasks: A detection task (reinforced response) and a discrimination task (nonreinforced response).

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Earlier studies demonstrated that morphine significantly increased the latencies at which monkeys discriminated 47°C and 49°C stimuli from innocuous temperatures of 37-43°C. Diazepam, in contrast to morphine, did not consistently reduce the discriminability of noxious heat (45-49°C) stimuli. In a second experiment, morphine again suppressed the discrimination of noxious heat stimuli (45° and 49°), and also increased discrimination latencies to 41° and 43°C stimuli. Diazepam had no systematic effect in this second experiment.

These findings suggest that morphine's effect is probably related to its attenuation of the perceived stimulus intensity apart from its effect on aversive aspects of the stimulus, since the effects were not limited to noxious stimuli.

PUBLICATIONS:

Mayer, D.J. and Price, D.D.: Central nervous system mechanisms of analgesia. Pain 2:379-404, 1976.

Hayes, R.L., Newlon, P.G., Rosecrans, J.A., and Mayer, D.J.: Reduction of stimulation-produced analgesia by lysergic acid diethylamide, a depressor of serotonergic neural activity. Brain Res. 122:367-372, 1977.

Hayes, R.L., Price, D.D., and Dubner, R.: Naloxone antagonism as evidence for narcotic mechanisms. Science 196:600, 1977.

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PROJECT TITLE: Regional Dental Research Center

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Philip F. Hirsch, Ph.D.
Dental Research Center
University of North Carolina
Chapel Hill, N. C. 27514

PROJECT NUMBER: P50 DE-02668

PROJECT PERIOD: 6/77 - active

PURPOSE:

The overall purpose of this regional research center is the support of research studying basic mechanisms in oral biology and clinical problems related to oral health. Research supported includes investigations in biomaterials; hemostasis; mineralization; craniofacial growth, function, and development; and neurobiology. Ongoing clinical research includes investigations of orofacial pain and speech disorders. Some clinical studies related to pain and pain control, as well as some basic studies in neurobiology include behavioral content or methodology.

METHODS AND FINDINGS:

The following projects currently or previously supported within this Regional Dental Research Center include behavioral content.

Dr. Duane A. Dreyer, Principal Investigator
"Psychophysical Measures of Combined Tactile and Thermal Sensitivity in Human Volunteers and in Patients with Defined Neurological Deficits."

Dr. John M. Gregg, Principal Investigator
"Studies of Maxillofacial Pain Mechanisms and Control."

"Studies on Neuropathic Trigeminal Pain: Mechanisms and Response to Therapy."

"Metabolic factors in chronic pain."

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Dr. Barry L. Whitsel, Principal Investigator
"Studies of the Somesthetic Capacities of Human Subjects."

"Neural Mechanisms Underlying Human Somesthetic Performance: A Correlative Psychophysical and Meurophysiological Investigation."

Findings which relate to behavioral aspects of research supported within this center include the following:

o Levels of 5-hydroxyindolacetic acid (5-HIAA), the end product of serotonin metabolism, were elevated in patients with pain of more than a few hours duration. The results suggest that the serotonin synthesized and released after pain experience may be an effect independent of its role in the pathology of mental depression.

o Firing patterns from cortical neurons (in primates) were followed after stimulating various body regions by mechanical stimuli that can be discriminated in humans; the ability of normal human subjects to detect direction of movement of stimuli crossing the skin at different velocities was measured, establishing criteria which have potential clinical value.

o Characterization and correlation of sensory neuropathy, personality patterns and pain following orthognathic surgery were completed. Though over 90% of certain of the orthognathic surgeries (e.g., sagittal split osteotomy) patients showed symptomatic neuropathy present one year or more following surgery, less than 10% of the patients interpreted their disorder as painful. In contrast accidental nerve trauma victims frequently reported comparable neuropathy as painful.

Among the relatively few orthagnathic patients who reported painful dysthesias (painful altered sensation), a personality

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profile with elevated MMPI scores for hypochondriasis, depression, hysteria, and paranoia, were found. This pattern was identical to that found among accidental injury patients with pain.

Space limitation precludes summarizing methods and findings for all behaviorally-relevant studies conducted over the past 12 years. Selected publications listed below provide an overview of behaviorally-relevant research.

PUBLICATIONS:

Dreyer, D.A., Hollins, M. and Whitsel, B.L.: Factors influencing cutaneous directional sensitivity. Sens. Proc. 2:71-79, 1978.

Dreyer, D.A., Duncan, G.H., Wong, C.L., and Whitsel, B.L.: Factors influencing capacity to judge direction of tactile stimulus movement on the face. J. Dent. Res. 58:2052-2057, 1979.

Dreyer, D.A., Duncan, G.H., Wong, C., Whitsel, B.L.: Factors influencing cutaneous direction sensitivity on the face. J. Dent. Res. (In press).

Duncan, G.H., Gregg, J.M., Ghia, J.N.: The pain profile: a computerized system for assessment of chronic pain. Pain. (In press).

George, J., Scott, D., Turner, S. and Gregg, J.M.: The effects of psychological stress and physical trauma on post-surgical recovery. J. Beh. Med. (In press).

Ghia, J.N., Toomey, T.C., Mao, W., Duncan, G. and Gregg, J.: Towards an understanding of chronic pain mechanisms: the use of psychological tests and a refined differential spinal block. Anesthesiology 50:20-25, 1979.

Ghia, J.N., Mueller, R.A., Mao, W., Scott, D.S., Duncan, G.S. and Gregg, J.M.: Variations in lumbar CSF 5-HIAA in man as a function of pain, pain mechanisms and depression. Biol. Psychiat. (In press).

Gregg, J.M., Small, E.W., Moore, R., Raft, D. and Toomey, T.: Emotional response to intravenous Δ^9-tetrahydrocannabinol during oral surgery. J. Oral Surg. 34:301-313, 1976.

Gregg, J.M.: The nature and control of pain, anxiety and stress among dental patients. In F. McCarthy (Ed.): Emergencies in Dental Practice, Philadelphia, W. B. Saunders. (In press).

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Raft, D., Toomey, T., and Gregg, J.: Behavior modification and haloperiodol in chronic facial pain. South Med. J. 72:155-159, 1978.

Raft, D., Toomey, T., and Gregg, J.M.: Behavior modification following drug therapy in treatment of chronic facial pain. Clin. Trials J. (In press).

Schreiner, R.C., Essick, G.K. and Whitsel, B.L.: Variability in sensory cortical neuron discharge: effects on the capacity to signal different stimulus conditions using a mean rate code. J. Neurophysiol. (In press).

Toomey, T.C., Ghia, J.N., Mao, W. and Gregg, J.M.: Acupuncture and chronic pain mechanisms: the moderating effects of affect, personality and stress on response to treatment. Pain 3:137-145, 1977.

Whitsel, B.L., Schreiner, R.C. and Essick, G.K.: An analysis of variability in somatosensory cortical neuron discharge. J. Neurophysiol. 40:589-607, 1977.

Whitsel, B.L., Dreyer, D.A., Hollins, M. and Young, M.L.: The coding of direction of tactile stimulus movement: correlative psychophysical and neurophysiological data. In D. Kenshalo (Ed): Sensory Functions of the Skin of Humans, pp. 79-107. New York, Plenum, 1980.

Whitsel, B.L., Dreyer, D.A. and Hollins, M.: Representation of moving stimuli by somatosensory neurons. B. Gordon-Lickey (Ed.): Integration of Information at the Single Neuron Level. Fed. Proc. (In press).

Whitsel, B.L., Dreyer, D.A. and Hollins, M.: The coding of direction of tactile stimulus movement: correlative psychophysical and neurophysiological data. Internat. Symposium on the Skin Senses. (In press).

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PROJECT TITLE; Psychophysiology of TMJ and Other Facial Pain Syndromes

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Daniel M. Laskin, D.D.S.
Department of Oral and Maxillofacial Surgery
College of Dentistry
University of Illinois
Chicago, Illinois 60612

PROJECT NUMBER: RO1 DE-02899

PROJECT PERIOD: 1/69 - active

PURPOSE:

Purposes of this project are: 1) to establish a better understanding of the etiology of various atypical facial pain syndromes, 2) to develop specific criteria for their differential diagnosis, and 3) to evolve a rational approach to their therapy. Because studies indicate that atypical facial pain may have a pychophysiologic basis, the role of these factors in etiology and treatment are being studied. Organic causes are also being studied.

METHODS AND FINDINGS:

Extensive clinical histories and physical examinations were done on all patients. Diagnostic testing included EMG activity, measurement of masticatory muscle silent-periods, and psychometric evaluation. Clinical studies were made of psychotropic drugs, relaxation techniques, equilibration procedures, bite plates and EMG biofeedback. Emphasis was placed on use and evaluation of placebo controls.

Facial pain not attributable to some clear physical disturbance frequently appeared to be related to masticatory muscle tension and spasm in response to some psychologic factors. It

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could be relieved by noninvasive methods such as psychotropic drugs, biofeedback training, and relaxation techniques, coupled with explanation of the relationship between stress and physical problems, and helping the patient identify and cope with stressful life situations.

PUBLICATIONS:

Baker, G. I. and Laskin, D. M.: Histochemical characterization of the muscles of mastication. J. Dent. Res. 48:97-104, 1969.

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Hilsabeck, R. B. and Laskin, D. M.: Arthroscopy of the temporomandibular joint of the rabbit. J. Oral Surg. 36:938, 1978.

Johnson, D. L. and Laskin, D. M.: Tests of connective tissues reactivity ir TMJ dysfunction patients. J. Dent. Res. 50:510, 1971.

Laskin, D. M.: Etiology of the pain-dysfunction syndrome. J. Am. Dent. Assoc. 79:147-153, 1969.

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Shipman, W. G., Greene, C. S. and Laskin, D. M.: Correlation of placebo responses and personality characteristics in myofascial pain-dysfunction (MPD) patients. J. Psychosom. Res. 18:475-483, 1974.

Sorensen, D. C. and Laskin, D. M.: Facial growth after condylectomy or ostectomy in the mandibular ramus. J. Oral Surg. 33:736-739, 1975.

Sutcher, H. D. and Laskin, D. M.: An artifact in mandibular position induced by the intrameatal cephalometric head holder. Am. J. Orthod. 59:338-342, 1971.

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PROJECT TITLE: The Central Mechanisms of Dental Pain and Analgesia

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Vahn A. Lewis, Ph.D.
Department of Pharmacology
Dental Branch
University of Texas Health Service Center
Houston, Texas 77025

PROJECT NUMBER: R23 DE-04646

PROJECT PERIOD: 1/77 - 12/79

PURPOSE:

The overall objective of this research was to examine the central and trigeminal mechanisms of orofacial pain and analgesia in freely behaving rats in an effort to relate these findings to the mechanisms underlying sensation.

METHODS AND FINDINGS:

Bioelectric changes were correlated with behavioral changes during stimuli and after drug injections. Scheduling of stimuli and recording of emitted behavior and neural events were monitored using a real-time computer controlled experimental station. Techniques included analgesic brain stimulation, intracerebral injection of drugs and horseradish peroxidase, electrolytic lesioning of the brain and trigeminal nucleus, and multiunit neural recording in unanesthetized animals. A signal detection paradigm was used to evaluate the effects of the narcotic analgesic morphine, the selective dopamine antagonist pimozide, the narcotic antagonist naloxone, and saline control on responding rats in a grid-shock escape test. Morphine and pimozide produced dose-related decreases in responding. An unexpected finding was that the elusive antianxiety property of morphine was clearly

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demonstrable in this test. These data suggest that this test procedure will be useful in identifying the function of specific brain loci that mediate dental pain and will allow study of analgesic sites as well as those sites that relieve the fear and suffering components of pain.

PUBLICATIONS:

Lewis, V.A. and Gebhart, G.F.: Morphine-induced and stimulation produced analgesias at coincident periaqueductal central gray loci: Evaluation of analgesic congruence, tolerance and cross-tolerance. Exp. Neurology 57:934-955, 1977.

Lewis, V.A.: The effects of morphine, pimozide and maloxone on response bias and discrimination by rats in a shock escape test. Soc. Exp. Biol. and Med., Nov. 1978 (abstract).

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PROJECT TITLE: Masseteric Exterioceptive Reflex and Sensory Responses in Myofacial Pain Dysfunction Patients

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Patricia A. McGrath, Ph.D. *
Neural Mechanisms Section
Neurobiology and Anesthesiology Branch
National Institute of Dental Research
Bethesda, Maryland 20014

PROJECT NUMBER: Z01 DE-00246

PROJECT PERIOD: 10/77 - 9/79

PURPOSE:

The purpose of this research was to measure sensory and pain thresholds to electrical stimulation of tooth pulp, and to correlate non-pain and pain sensations with the masseter exteroceptive reflex in patients with chronic oral-facial pain. Electromyographic recordings were used to compare exteroceptive and proprioceptive suppression of the masseter activity of these patients.

METHODS AND FINDINGS:

Upper central incisors were stimulated by electric pulses at current values ranging from below detection threshold to above pain threshold, while subjects maintained low or high masseter activity. The masseter inhibitory periods evoked by electrical tooth pulp stimulation im MPD patients had latencies, durations, and configurations, similar to those evoked in healthy subjects. However, MPD patients had significantly lower thresholds for the masseter inhibitory periods than healthy subjects and they showed an increased tendency toward cyclical or rhythmic grouping action in their masseter muscles.

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Sharav, Yair: Dissociation between sensation and reflex activity evoked by tooth-pulp stimulation. International Association for the Study of Pain, Satellite Symposium, Geneva Park, Ontario, Canada, August 26, 1978. (abstract)

* Principal investigator during year I of this project was Dr. Yair Sharav (currently at Hadassah Medical Center, Hebrew University, Jerusalem, Israel).

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PROJECT TITLE: Dental Electroanalgesia and Placebo in Pain Control

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Patricia Anne McGrath, Ph.D.
Faculty of Dentistry
Department of Oral Medicine
University of Western Ontario
London, Ontario, Canada

PROJECT SPONSOR:

Gary B. Rollman, Ph.D.
Department of Psychology
University of Western Ontario
London, Ontario, Canada

PROJECT NUMBER: F32 DE-05265

PROJECT PERIOD: 9/80 - active

PURPOSE:

The dual goals of this project are to examine the peripheral and central mechanisms of analgesia evoked by monopolar, cathodal electrical stimulation of central incisors and to quantify some of the psychological factors that mediate a placebo analgesia.

METHODS AND FINDINGS:

Electrical stimulation will be applied to central incisors; thresholds for detection and for pain on the central and lateral incisors will then be measured in order to assess the extent of analgesia produced by the electrical stimulation. If the lateral incisor is affected, then central mechanisms would appear to be involved in this analgesia. A narcotic - antagonist will be administered to determine if the analgesia is reversable, thus suggesting involvement of endorphins in the analgesia.

Both experimental pain (tooth pulp stimulation) and real pain (post third molar extractions) will be measured several times

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before and after the administration of a pain relief drug, narcotic analgesic or saline-placebo. The effects of modifying psychological factors, such as expectation and desire for pain relief, on placebo analgesia will be determined for both types of pain.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Psychophysical and Electrophysiological Studies of First and Second Pain

PRINCIPAL INVESTIGATORS AND ORGANIZATION:

Donald D. Price, Ph.D.
and
Ronald Dubner, D.D.S., Ph.D.
Neurobiology and Anesthesiology Branch
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-0152

PROJECT PERIOD: 1975 - 1977

PURPOSE:

Purposes were to learn how first and second pain evoked by a brief impulse of strong, but not damaging heat, were influenced by repeated stimuli and by spinal cord integrative mechanisms of summation. This work was part of an effort to learn more about chronic pain and how it affects humans.

METHODS AND FINDINGS:

Heat stimuli were presented via a contact thermode to the dorsal surface of the subject's hand. Cross-modality matches to the perceived intensity of first and second pain were made by squeezing a handgrip dynanometer. Reaction times to perceived first and second pain also were obtained. In a related electro-physiological study, single unit recordings were made from primary afferent fibers in the monkey.

The early latency responses, like first pain, decreased in intensity with repetition of heat pulses but not with repeated electrical stimuli The second or late neuronal response, like second pain, outlasted the arrival of the next incoming impulse and summated in intensity with repeated heat pulses or electric shocks provided that there was about

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three seconds between the impulses. The evidence suggests that heat-induced suppression of first pain and early neuronal responses come from suppression of A delta heat-nonciceptive afferents and that summation of heat-induced second pain and of the late neuronal response result from spinal cord mechanisms activated by C polymodal nonciceptive afferents.

PUBLICATIONS:

Price, D. D.: Modulation of first and second pain by peripheral stimulation and by psychological set. In Bonica, J. J. and Albe-Fessard, D. (Eds.) Advances in Pain Research and Therapy, Vol. 1, New York: Raven Press, 427-432, 1977.

Price, D. D. and Dubner, R.: Neurons that subserve the sensory discriminative aspects of pain. Pain, 3:307-338, 1977.

Price, D. D. and Dubner, R.: Peripheral and central mechanisms of first and second pain. J. of Investigative Dermatology, 69:167-171, 1977.

Price, D. D., Hu, J. W., Dubner, R., and Gracely, R. H.: Peripheral suppression of first pain and central summation of second pain evoked by noxious heat pulses. Pain, 3:57-68, 1977.

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PROJECT TITLE: Experimental and Periodontal Pain

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Gene M. Smith, Ph.D.
Department of Anesthesia
Erich Lindemann Mental Health Center
Boston, Massachusetts 02114

PROJECT NUMBER: RO1 DE-04939

PROJECT PERIOD: 3/78 - Active

PURPOSE:

The purposes of this project were as follows: (1) to develop a method for inducing, under controlled standardized procedures, graded levels of pain during periodontal surgery; (2) to test that method for its ability to discriminate among drugs for analgesic potency and (3) to clarify the influence of personal variables upon the pain response.

METHODS AND FINDINGS:

Periodontal, radiant heat, electric shock, and tourniquet pressure sources of pain are being used to test the stability of individual differences in tolerance of pain and to learn whether such tolerance is a general behavior trait. Subjects are healthy adult volunteers.

The current findings have shown that pain produced by the study procedures is greater in the mandibular than in the maxillary arches and influenced both by tooth surface and by degree of periodontal disease. There is also evidence that the psychological variables measured are significantly predictive of pain produced by the periodontal procedures tested in the project.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Taste and Its Disorders

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

James M. Weiffenbach, Ph.D.
Diagnostic Systems Branch
Oral Pharyngeal Development Section
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00212

PROJECT PERIOD: 1977 - active

PURPOSE:

The selection and refinement of appropriate psychophysical methods for the separate measurement of the various aspects of taste perception is a primary concern of this project. Normal variation in taste perception with chronological age is assessed by procedures which quantify not only the taste detection threshold but also intensity and pleasantness of the subject's taste experience. Both naturally occurring anomalies and therapeutically induced changes in taste are investigated in parallel studies which emphasize the role of saliva in distortions of taste perception. Finally, the possibility that taste perception differences exist between individuals with and without caries experience is being investigated.

METHODS AND FINDINGS:

Whole mouth stimulation with room temperature tastant fluids is presented in these experiments. For threshold measurement, the "up-down" procedure for determining stimulus presentation order is combined with the forced-choice procedure for measuring response. Measures of the intensity and pleasantness of supra-threshold stimulation are obtained by magnitude estimation and cross modality matching.

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The sensitivity of magnitude estimation procedures to "sweet aversion" phenomena previously suggested by pilot studies has been confirmed in systematic studies of normal high school and college students.

A novel modification of standard magnitude estimation procedures has been perfected which allows subjects to indicate the intensity or pleasantness of their perceptual experience by generating lengths rather than assigning numbers. Children as young as 4.5 years of age can be tested with this procedure. Also, calibration studies with adults indicate that the modified procedure provides data as reliable as that produced when the same individuals respond with numbers.

Preliminary results suggest that clinical reports of metallic taste may bear a strong relation to the generation of elevated ($>$ 100 millivolt) potentials between fillings of dissimilar metal.

PUBLICATIONS:

Cowart, B.J.: The development of taste perception in humans: sensitivity and preference throughout the life span. Psychol. Bulletin. (In press).

Wolf, R.O. and Weiffenbach, J.M.: Saliva and taste disorders. Proc. of 28th Inter. Congress of Physiological Sciences, 1980, Akademiai Kiado, Publishing House of the Academy of Science, Budapest, Hungary. (In press).

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PROJECT TITLE: Oral Reflexes of the Infant

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

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Diagnostic Systems Branch
Oral and Pharyngeal Development Section
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00124

PROJECT PERIOD: 1973 - active

PURPOSE:

This project explores the oral sensory competence of the newborn human infant, including both touch sensitivity and sensory mechanisms underlying neonatal taste experience. Since infants are sensitive to taste at birth, it may be possible, as has been contended based on animal studies, that early taste experience shapes later food preferences and dietary habits.

METHODS AND FINDINGS:

Observed reflex displacement of the tip of the newborn's tongue toward the side of stimulation is used as the basis for assessing the sensitivity of the tongue to both touch and taste. For touch stimulation, the frequence of response occurrence is a function of stimulus intensity. An analogous relation of response frequency to strength of taste solution is obtained if the response to this solvent alone is first adapted. Post-adaptation increments in responding above that found with continued water stimulation have been demonstrated for both glucose and sodium chloride test solutions.

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PUBLICATIONS:

Weiffenbach, J.M., Daniel, P.A. and Cowart, B.: The Development of Saltiness Perception. In M.R. Kare, M.J. Fregley, R.A. Bernard, (Eds.): Biological and Behavioral Aspects of Salt Intake. New York, Academic Press, 1980.

Cowart, B.J.: The development of taste perception in humans: sensitivity and preference throughout the life span. Psych. Bull. (In press).

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PROJECT TITLE: Tooth Pulp Pain: Analgesic and Behavioral Factors

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

B. Berthold Wolff, Ph.D.
Department of Psychology
School of Medicine
New York University
New York, N. Y. 10016

PROJECT NUMBER: RO1 DE GM-04095

PROJECT PERIOD: 6/75 - 8/78

PURPOSE:

Objectives stated by the investigator include developing electrical tooth pulp stimulation as a valid psychophysical method for human analgesic assays and examining types of behavioral response associated with tooth pulp stimulation. The investigators note that valid and reliable relationships should be established between clinical and experimentally-induced pain. They argue that tooth pulp pain stimulation is of particular research interest since the experimentally-induced sensations of pain are similar to clinical tooth ache involving tooth pulp and share psychological components, (i.e., anxiety) associated with clinical pain. In contrast, many other types of experimental noxious stimuli do not simulate or mimic clinically-experienced pain.

METHODS AND FINDINGS:

In addition to many pilot studies on various technical aspects of tooth pulp stimulation, three major studies were completed. The first study investigated the types of sensations elicited by electrical stimulation of the human tooth pulp. Results showed that the detection threshold could be discriminated from pain threshold at statistically highly significant levels. This was demonstrated in all subjects and with no within-subject overlaps between

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detection and pain thresholds. The investigators interpreted these results as an unequivocal demonstration that healthy human adults can discriminate at least two distinct sensory modalities following electrical stimulation of the tooth pulp --- a finding in contrast with the conventional belief that tooth pulp stimulation only produces pain.

A second study was an analgesic assay involving the use of 1200 mg. aspirin, 60 mg. codeine, and a placebo. Several pain response parameters were measured. Tooth pulp stimulation showed a better proportional sensitivity to aspirin than did cutaneous stimulation, but appeared to be less sensitive to codeine than was the cutaneous electrical stimulation technique.

A third study compared pain thresholds and pain tolerance measures under several different noxious stimulus conditions, i.e., tooth pulp stimulation, electrical finger shock, and cold pressor (ice water) stimulation, of the hand. Each subject also completed two personality tests (Eysenck Personality Inventory and Cattell 16 PF Questionnaire). Relationships between personality data and pain response data were evaluated using factor analytic techniques.

PUBLICATIONS:

Wolff, B.B.: Psychosocial aspects of the patient with chronic pain. In P. I. LeRoy (Ed.): Current Concepts in the Management of Chronic Pain, Symposia Specialists, Miami, 1977.

Wolff, B.B.: Behavioral measurement of human pain. In R. A. Sternbach (Ed.): The Psychology of Pain, New York, Raven Press, 1978.

Wolff, B.B.: Measurement of the behavioral aspects of pain. In J. H. Perryman (Ed.): Oral Physiology and Occlusion, New York, Pergamon Press, 1978.

Wolff, B.B.: Measurement of human pain. In J. J. Bonica (Ed.): Pain: New York, Raven Press, 1979.

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D. ORAL-MOTOR BEHAVIORS

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PROJECT TITLE: Behavioral Treatment for Nocturnal Bruxism

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Steven C. Fischer, Ph.D.
Department of Psychiatry
Boston University
Boston, Massachusetts 02118

PROJECT NUMBER: R23 DE-05527

PROJECT PERIOD: 1/80 - active

PURPOSE:

The purpose of this research is to identify behavioral treatment procedures which reduce or eliminate bruxing behaviors in adults with a history of bruxing for at least one year. The investigator's aim is to develop and test procedures which have potential applicability in psychological and dental treatment.

METHODS AND FINDINGS:

The first experiment is designed to determine whether nocturnal bruxism can be reduced by a contingent awakening procedure. Baseline bruxing data will be collected on control and experimental subjects; an acrylic mouthpiece with pressure sensitive electrodes will be used for automated data collection. For the following three weeks, experimental subjects will be wakened immediately with a loud auditory signal when they begin to brux. Control subjects' bruxing activity will be monitored, but they will not be contingently awakened. Follow-up monitoring is planned for both experimental and control subjects at three, six, and twelve months.

A second study is planned to compare the efficacy of three behavioral treatments for bruxing. The three behavioral treatments

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to be compared are: (1) contingent awakening, (2) massed practice, and (3) EMG biofeedback.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Study of Methods to Control Bruxism

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Albert G. Forgione, Ph.D.
Department of Psychology
Tufts University
Boston, Massachusetts 02111

PROJECT NUMBER: R23 DE-03968

PROJECT PERIOD: 6/74 - 11/77

PURPOSE:

The overall goal of the research was to evaluate alternative behavioral treatments for functional bruxism. The investigators also attempted to find out whether some treatments are more effective with certain personality types.

Specific objectives were:

(1) To evaluate a bruxism monitoring device which provided an electronic recording of bruxing activity.

(2) To determine whether occlusal adjustment is necessary and/or sufficient for the long term reduction of bruxing behavior.

(3) To evaluate six methods of behavioral control of bruxism.

(4) To examine correlations between personality types and response to various behavioral methods of symptom control.

METHODS AND FINDINGS:

A series of experiments were performed on groups of bruxists and non-bruxists. Findings were as follows:

(1) Treatment of bruxism by massed practice is not as effective as indicated in the literature.

(2) Deep muscle relaxation training tends to reduce bruxing behavior.

(3) The Kelly Rep Test appears to identify behavioral characteristics of those who brux and/or experience TMJ problems.

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(4) A laminated plastic mouthpiece with electronic sensors produced data on the locus and intensity of night grinding, and was identified as a sensitive indicator of subtle changes associated with treatment.

PUBLICATIONS:

Heller, R. F. and Forgione, A. G.: An evaluation of bruxism control: Massed negative practice and automated relaxation training. J. Dent. Res. 54:1120-1123, 1975.

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PROJECT TITLE: Behavioral Control of Bruxism

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Alan G. Glaros, Ph.D.
Department of Psychology
Wayne State University
Detroit, Michigan 48202

PROJECT NUMBER: R23 DE-04536

PROJECT PERIOD: 6/76 - 5/79

PURPOSE:

The objectives of the research were to assess significant behavioral dimensions of bruxism and to evaluate the efficacy of several behavioral treatment strategies. The investigator viewed bruxism as a disorder of arousal affected by situational factors. They tested the following three hypotheses:

A. Bruxists show higher levels of physiological arousal than do normals.

B. Bruxists respond significantly more to stress than do normals.

C. Bruxists and normals do not differ significantly on various trait measures of personality.

METHODS AND FINDINGS:

Studying both individuals who brux and those who do not, the investigators measured masseter muscle EMG activity as a diagnostic indicator of bruxism. The effectiveness of classical avoidance conditioning as a treatment for bruxism was evaluated in at-home clinical trials. Effectiveness of biofeedback for diurnal bruxism was compared to relaxation training, a psychotherapy control, and a dental treatment control. The effectiveness of cognitive control procedure for diurnal bruxism was also evaluated.

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Some of the findings were:

(1) Bruxism is a psychophysiological disorder of arousal, e.g., bruxists respond significantly more to stress than do normals. Since bruxism appears to be more responsive to situational than trait factors, treatment for bruxism is likely to be more effective if it focuses on specific behaviors rather than attempting larger scale personality changes.

(2) Masseter EMGs under both resting and stress conditions differentiate bruxists from normals.

(3) Biofeedback training reduces masseter EMG activity in bruxists by about half over baseline levels and reduces self-reported clenching and grinding by about two-thirds.

(4) A survey of a normal adult (student) population indicated that nearly a third of the population experienced clenching or grinding at some point in their lives, that diurnal clenchers were more than twice as prevalent as nocturnal grinders, that no significant differences existed in incidence between the sexes, and that diurnal clenchers were more responsive to stress than nocturnal grinders.

PUBLICATIONS:

Glaros, A. G., and Rao, S. M.: Bruxism: A critical review. Psychol. Bull. 84:767-781, 1977. Reprinted in Der Zahnaitt, 22:91-97, 1978.

Glaros, A. G., and Rao, S. M.: Effects of bruxism: A review of the literature. J. Prosth. Dent. 28:149-157, 1977. Reprinted in Der Zabnartz 21:599-610, 1977.

Glaros, A.G.: Incidence of nocturnal and diurnal bruxism. Prosthetic Dentistry. (In press).

Rao, S. M., and Glaros, A. G.: Electromyographic correlates of experimentally induced stress in diurnal bruxists and normals. J. Dent. Res. 58:1872-1878, 1979.

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E. ADOPTION AND MAINTENANCE OF PREVENTIVE MEASURES

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PROJECT TITLE: Clinical Field Trial to Assess the Cost-Effectiveness of Various Caries Preventive Agents

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Neville Doherty, Ph.D.
and
Elbert Powell, D.D.S., M.P.H.
Department of Behavioral Sciences and Community Health
University of Connecticut Health Center
Farmington, Connecticut 06032

PROJECT NUMBER: NO1 DE-52449

PROJECT PERIOD: 4/75 - 7/80

PURPOSE:

This school-based clinical trial was designed to assess the cost and effectiveness of three caries preventive agents used alone and in combination. The three agents studied were APF (acidulated phosphate fluoride) gel, NaF (sodium fluoride) mouthrinse, and a pit and fissure sealant.

METHODS AND FINDINGS:

Three agents - APF gel, NaF mouthrinse, and pit and fissure sealant --- were used over a three-year period with almost 2,000 school children. Ages of the children ranged from 11-13 years at the beginning of the study. Children were randomly assigned to either a control condition or one of seven treatment conditions, in which the above preventive agents were administered singly or in combination. The study was conducted in a non-fluoridated industrial city in the Northeastern United States. One year after the conclusion of treatment, those remaining in the study (61%) were given dental examinations.

None of the treatments (3 single and 4 combined procedures) showed a reduction in DMFS (Decayed-Missing-Filled Surfaces) when compared with the control group. However, mouthrinse was found to be effective (.87 average reduction in DMFS) when

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all subjects receiving the treatment were compared with all those not receiving it.

Because the analysis failed to reveal a clear ranking of treatments in terms of effectiveness, the planned cost-effectiveness analysis was not undertaken. However, cost data, reflecting the value of all treatment-related resources, were collected throughout the study. Over the three year period, annual treatment costs, in 1976 dollars, were found to vary from $12.70 per subject for mouthrinse alone to $55.92 for the combined mouthrinse, sealant, and gel treatment.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: A Comprehensive Caries Control Program: Design and Evaluation

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Dr. Stuart Fischman
Department of Oral Biology
School of Dentistry
State University of New York at Buffalo
Buffalo, New York 14214

PROJECT NUMBER: NO1 DE-22406

PROJECT PERIOD: 6/72 - 6/77

PURPOSE:

The purpose of this project was to provide a community-based clinical trials evaluation of several well established measures for prevention of dental caries. The study included: 1) testing and evaluation of available scientific methods of prevention, and 2) analysis of relevant socio-behavioral, economic and organizational factors.

METHODS AND FINDINGS:

The sample studied consisted of 1,800 sixth-grade children from public and parochial schools in Buffalo, New York, an area which has had an artifically fluoridated water supply for many years. Students were randomly assigned to one of three treatment conditions; treatment continued for three years with observations continued over one additional year. Students in one group received an annual prophylaxis and application of sealant and topical fluoride; the second group received these procedures plus basic instruction in proper brushing and flossing techniques and a program of activities aimed at motivating improved dental home care habits; a third group received only an annual prophylaxis.

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A DMFS (Decayed-Missing-Filled Surfaces) index and a plaque and gingival index were included among measures obtained during oral examinations. These oral examinations occurred periodically during treatment and follow-up periods.

Results of the study indicated that, in a fluoridated area, where routine restorative care is available, the addition of topical fluoride and a program to motivate subjects toward self-care did not significantly reduce smooth surface dental caries. With application of dental sealants, a significant reduction of dental caries occurred during the course of the three-year clinical trial; this was observable primarily in the occlusal surfaces of posterior teeth.

The behavioral-motivational part of the program produced a significant reduction of plaque scores at the end of the third year, but this reduction did not continue in the subsequent year. Findings support the need for the development of additional anti-caries measures for use in optimally fluoridated communities.

PUBLICATIONS:

Fischman, S.L., Picozzi, A., Juliano, D.B., Slakter, M.J., English, J.A.: Examiner standardization for caries studies. J. Dent. Res. 55:926-929, 1976.

Fischman, S.L., English, J., Albino, J., Bissell, G., Greenberg, J.S., Juliano, D.B., O'Shea, R., and Slakter, M.J.: A comprehensive caries control program-design and evaluation of the clinical trial. J. Dent. Res. 56:99-103, 1977.

Fischman, S.L.: Design of studies to evaluate plaque control agents. J. Dent. Res. 58:2389-2395, 1979.

Fleiss, J., Fischman, S.L., Chilton, N., and Park, M.: Reliability of discrete measurements in caries trials. Caries Res. 13:23-31, 1979.

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Greenberg, J.S.: An analysis of various teaching modes in dental health education. J. School Health 26-32, 1977.

Lehnhoff, R.W., Grainger, R.M.: Use of analysis of covariance in periodontal clinical trials. J. of Perio. Res. 9, Suppl. 14: 143-159, 1974.

Slakter, M.J., Juliano, D.B., Fischman, S.L.: Estimating examiner consistency with DMFS measures. J. Dent. Res. 55:930-934, 1976.

BEST DOCUMENT AVAILABLE

PROJECT TITLE: The Role of the Practicing Dentist in the Delivery of Caries Prevention

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Helen C. Gift, Ph.D.
Division of Behavioral Science
American Dental Association
Chicago, Illinois 60611

PROJECT NUMBER: NO1 DE-32423

PROJECT PERIOD: 5/73 - 5/75

PURPOSE:

The goals of this project were to determine dentists' use of, and attitude toward, preventive services for children. The intent was also to investigate the attitudes of dentists toward possible future systems for the delivery of comprehensive preventive treatment, either within private practice, or by some alternate delivery mode. This was an attempt to evaluate the dentist's self-perceived role in the delivery of comprehensive preventive care for children irrespective of the mode by which the services were provided. Another goal was to determine the effectiveness of the dentist singly, and as a member of professional societies, in changing public attitudes and behavior relative to caries preventive measures.

METHODS AND FINDINGS:

The comprehensive theoretical framework used to explain the dentist's preventive orientation in this study was a two-stage model of predisposing and enabling components incorporating variables of dental training, organized professional activities, personal attitudes, patient types, community characteristics, and practice characteristics. The additional preventive

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orientation components included were the use of preventive procedures and the attitude toward comprehensive caries prevention programs for children. The results were based on multivariate analyses of responses from a national survey of approximately 4,000 dentists. The survey identified dentists who were high or low utilizers of preventive procedures as well as dentists with differing attitudes toward provision of preventive dental care to children. The analysis provided an overall picture of the interrelation of the variables as well as the sequence of conditions leading to the use of preventive procedures.

Results indicated dentists' awareness of the need for preventive care was generally high. Dentists recognized that many preventive services could be provided outside the private practice setting, and were willing to assist as needed to provide more preventive care for children by alternative delivery systems such as in a school situation.

PUBLICATIONS:

Gift, H.C. and Schaid, K.A.: Involvement of parents in oral hygiene education of child patients. J. Dent. Child. 41:437-438, 1974.

Gift, H.C.: Patterns of dental practice in the United States: solo vs. group practice. J. Amer. Dent. Assoc. 91:148-152, 1975.

Gift, H.C. and Milton, B.B.: Comparison of two national preventive dentistry surveys: 1957 and 1974. J. of Preventive Dent., Vol. 2, No. 6, 1975.

Gift, H.C., Frew, R., and Hefferen, J.J.: Attitudes towards and use of pit and fissure sealants. J. Dent. Child. 42:460-466, 1975.

Gift, H.C., Muller, T., and Newman, J.: Characteristics of dental oral hygiene education in private practice. J. Prevent. Dent. 2:37-40, 1975.

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PROJECT TITLE: The Role of Dentists and Pediatricians in the Use of Caries Prevention Methods

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Helen C. Gift, Ph.D.
American Dental Association
Health Foundation
Chicago, Illinois 60611

PROJECT NUMBER: NO1 DE-02424

PROJECT PERIOD: 6/80 - active

PURPOSE:

The objectives of this project are to assess:

(1) The extent of knowledge of current caries prevention methods among dental practitioners and pediatricians.

(2) The acceptance and use of these procedures among practitioners.

(3) The extent to which practicing dentists and pediatricians advise patients regarding caries prevention.

(4) The characteristics of dentists and pediatricians who are aware of and receptive to preventive philosophies.

METHODS AND FINDINGS:

A pretest of 50 dentists and physicians is being performed using a mailed questionnaire followed by personal interviews. Following survey instrument development, a national study will be conducted to obtain data from a stratified sample of 3.500 general practice dentists, 250 periodontists, 250 dentists from various specialties and 2,000 pediatricians and/or family practice medical specialists. A mailed questionnaire is initially being administered with appropriate follow-up

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to insure a high response rate and validity. The sample represents subgroups who have been identified on the assumption that these practitioners have the most direct involvement in caries prevention.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Children's Acceptance of Caries Preventive Procedures

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

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Department of Behavioral Sciences and Community Health
School of Dentistry
University of Connecticut Health Center
Farmington, Connecticut 06032

PROJECT NUMBER: R01 DE-03868

PROJECT PERIOD: 7/74 - active

PURPOSE:

The overall objective of the project is to develop both theory and technology relating to children's acceptance and use of caries preventive agents. Specific goals are:

(1) to determine the extent to which children accept and use new agents;

(2) to determine means to persuade children to accept them;

(3) to determine characterisitics of children who do and do not accept caries preventive agents.

METHODS AND FINDINGS:

This project has been carried out over two consecutive periods, an original grant period, and a competitive renewal period. Two experiments using seventh grade children from three suburban and three urban schools were conducted in the first period; two additional experiments which used seventh grade children from four suburban and four urban schools were conducted in the second period. About 2,000 children have been involved in the research by this time.

In the original period, the standard methodology for all subsequent investigators was developed.

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Findings from the first period of research were as follows:

(1) An in-school program of topical applications at six-month intervals which used professional personnel obtained more compliance than an at-home 20-week daily mouthrinse program.

(2) Provision of contingent rewards, along with information, led to greater compliance than did information alone; group discussions along with information led to less compliance than did information alone.

(3) Health beliefs were not predictive of program participation.

Analysis of data from the second period is currently being carried out. However, certain findings from the last two experiments are already available, as follows:

(1) post cards mailed to children to remind them of appointments had no effect on compliance;

(2) a procedure which provided specific instructions on how to obtain permission from parents, where the mouthrinse dispenser should be kept at home, how it should be used, and how the dispenser should be brought to and from school, had positive effects on compliance for urban children and negative effects on compliance for suburban children;

(3) without rewards, only a very small percentage of children continued to use mouthrinse in the second year of the long-term program.

PUBLICATIONS:

Kelly, T.A., Kegeles, S.S., Lund, A.K., and Weisenberg, M.: Knowledge and attitudinal effects of a children's dental slide show. J. of Prevent. Dent. 3(1):30-34, 1976.

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Lund, A.K., Kegeles, S.S., and Weisenberg, M.: Motivational techniques for increasing public acceptance of preventive health measures. Med. Care 15(8):678-692, 1977.

Lund, A.K., Kegeles, S.S.: Children's preventive dental programs. Behavioral Dentistry: Proceedings of the First National Conference, Morgantown, West Virginia. In B.D. Ingersoll, R. J. Seime, and W.R. McCutcheon (Eds.), pp. 57-73, 1978.

Lund, A.K., and Kegeles, S.S.: Partial reward schedules and self-management techniques in children's preventive dental programs. Clinical Research in Behavioral Dentistry: Proceedings of the Second National Conference on Behavioral Dentistry, Morgantown, W.Va. In B.D. Ingersoll and W.R. McCutcheon (Eds.), pp. 141-158, 1980.

Weisenberg, M., Kegeles, S.S., and Lund, A.K.: Children's health beliefs and acceptance of a dental preventive activity. J. of Health and Soc. Beh. 21:59-74, 1980.

Kegeles, S.S., Lund, A.K.: Perceived control of health and children's acceptance of preventive dentistry. International Assoc. for Dental Res. Meetings, March 1979, New Orleans, La. (Abstract)

Lund, A.K., Kegeles, S.S.: Cognitive and behavioral strategies for children's preventive dental behavior. International Assoc. for Dental Res. Meetings, March 1979, New Orleans, La. (Abstract)

Lund, A.K., Kegeles, S.S., and Weisenberg, M.: Children, preventive dentistry and the health belief model. Presented at the International Assoc. of Dental Res., Las Vegas, 1979. (Abstract).

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PROJECT TITLE: Clinical Test: Preventive Dentistry for the Aged

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Asuman Kiyak, Ph.D.
Department of Community Dentistry
School of Dentistry
University of Washington
Seattle, Washington 98195

PROJECT NUMBER: R23 DE-05235

PROJECT PERIOD: 1/79 - 1/80

PURPOSE:

The aims of this project were to develop and compare the efficacy of several alternative programs in preventive dentistry for an institutionalized elderly population. The research represented an initial effort to educate the elderly in oral hygiene and to monitor the success of such programs.

METHODS AND FINDINGS:

Immediate and long term effects of several different preventive education models were assessed. The impact of these models was compared with the effects of the periodic checkup and a non-intervention (control) condition. Comparisons were made concerning oral hygiene habits, oral health status, and psychological characteristics such as self-esteem and morale. Sixty-eight elderly institutionalized participants comprised the study population.

Group comparisons revealed significant differences at the pre-intervention and immediate post-intervention assessments. The self-monitoring group had the highest plaque levels at the pre-test, but the lowest at the immediate post-program assessment. Plaque levels remained low for this group throughout the 12-week assessment. The education-only group showed increasing levels of plaque over time.

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The self-monitoring program also resulted in improved oral h lth behaviors (i.e., brushing teeth or dentures, soaking dentures overnight), while there was no change for other groups.

Other areas where preventive dentistry education was expected to affect the individual were perceived physical health, morale and self-esteem. As with the other dependent variables, improvements were significant only for subjects in the self-monitoring group. Self-evaluations of health and self-esteem were highest for the latter group of post-intervention; no group differences were observed in morale.

Results of this study suggest that the elderly can be taught self-care in oral hygiene. Even those with some cognitive decline in institutional settings can learn self-care designed specially for them. However, the program must utilize self-monitoring techniques to be maximally effective.

PUBLICATIONS:

Kiyak, A.H.: An experimental preventive dentistry program for institutionalized elderly. In Ingersoll, B.D. and McCutcheon, W.R. (Eds.): Clinical Research in Behavioral Dentistry. Morgantown, West Virginia Univ. Press, 1979, pp. 175-195.

Kiyak, A.H.: Motor control and dental skills of institutionalized elderly. In Bryant, P.S., Gale, E. and Rugh, J. (Eds.): Oral Motor Behavior: Impact on Oral Conditions and Dental Treatment. U.S. Dept. of Health, Education and Welfare, Public Health Service, National Institutes of Health, NIH Publ. No. 79-1848, 1979, pp. 216-219.

Kiyak, A.H.: Educating institutionalized elderly in self-care. In Symposium on Geriatric Dentistry. J. of Internat'l. Assoc. for Dent. Res., Mar. 1979. (Abstract).

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PROJECT TITLE: Preventive Dental Behavior in a Clinic Population

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Dushanka V. Kleinman, D.D.S.
Boston University School of Graduate
Dentistry and Public Health
Boston, Massachusetts 02118

PROJECT SPONSOR:

Anthony Jong, D.D.S., M.P.H., D.Sc.D.
Boston University
Boston, Massachusetts 02118

PROJECT NUMBER: 1 F32 DE-05015

PROJECT PERIOD: 5/76 - 5/77

PURPOSE:

The objective of this project was to evaluate the effects of a preventive dental health education course upon dental knowledge, attitudes, and behaviors of child dental patients and their mothers. The study tested the hypothesis that concentrated instruction on oral hygiene, when provided in combination with dental care, would improve various long-term dental behaviors.

METHODS AND FINDINGS:

The population studied were patients at a public health dental clinic and their mothers. Mothers and children in the experimental group received a preventive dental health education course scheduled in conjunction with the child's dental treatment. A control group from the same clinic did not receive the dental education component, though they did receive dental treatment and routine instruction during treatment.

Results showed that the health education course did have a favorable immediate and six-month effect on the preventive knowledge

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of children and mothers in the experimental group. However, no significant differences were found between the experimental and control groups in the indices measuring preventive attitudes and behaviors.

PUBLICATIONS:

None.

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PROJECT TITLE: Transfer of Preventive Health Principles to Dentistry

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

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Department of Dental Care Administration
Harvard School of Dental Medicine
Harvard University
Boston, Massachusetts 02115

PROJECT SPONSOR:

Chester Douglass, D.D.S., Ph.D.
Chairman, Department of Dental Care Administration
Harvard School of Dental Medicine
Harvard University
Boston, Massachusetts 02115

PROJECT NUMBER: F32 DE-05239

PROJECT PERIOD: 1/80 - active

PURPOSE:

The research goal is to study whether preventive health knowledge, attitudes and behaviors transfer across disease categories. Project hypotheses are based on the learning theory principle of transfer of training. The study will attempt to determine whether subjects who are learning to reduce health risks associated with coronary heart disease also show changes in attitudes and behaviors related to dental diseases.

METHODS AND FINDINGS:

All 300 members of the Special Intervention group of the MRFIT* study at Harvard University comprise the experimental subjects; controls are derived from the 300 members of the Usual Care group of the same study.

The key collection instrument is a questionnaire. The predictive hypotheses are:

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(1) Positive preventive health transfer will occur in each of the three tested indices: preventive dental health knowledge, attitudes, and behaviors.

(2) Internal Locus of Control subjects will show the most significant transfer and this index will be a predictor of preventive behavior.

(3) The most significant independent variable predictors of transfer is the level of education.

(4) Greatest preventive health transfer will be seen in those actions which show the most similarity across the health areas, e.g., medical and dental check-ups, low saturated fat and low sucrose diets.

PUBLICATIONS:

Not yet available.

* The MRFIT study (Multiple Risk Factor Intervention Trial) is organized to determine if reduction of risk factors related to coronary heart disease prevents heart attacks and premature death in a high-risk segment of the U.S. population.

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PROJECT TITLE: Compliance Factors in Caries Prevention

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Mata K. Nikias, D.D.S., Ph.D.
Center for Community Health Systems
Columbia University
New York, New York 10032

PROJECT NUMBER: R01 DE-04303

PROJECT PERIOD: 2/77 - 12/79

PURPOSE:

The overall objectives of this research are to: (1) determine the extent to which people comply with caries preventive regiments and maintain preventive behavior over time, and (2) identify the set of factors which influence levels and patterns of compliance and maintenance of caries preventive behavior.

Specific research aims are to:

(1) Analyze compliance (rates, length of time and patterns) to caries prevention procedures among patients who have received professionally recognized preventive programs in private practice settings.

(2) Identify demographic, social and psychological characteristics as well as the dental experiences of persons which influence rates and patterns of compliance.

(3) Identify characteristics and processes of the dental setting which are associated with rates and patterns of compliance.

(4) Analyze relationships of elements of the regimen to compliance.

(5) Analyze the role of home environment and of social support in compliance behaviors.

(6) Examine the relative effect on compliance of each of the variables subsumed in above objectives #2 - #5.

(7) Identify different types of "high" and "low" compliers.

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METHODS AND FINDINGS:

This study provides a follow-up investigation of adult patients who have completed formal preventive dentistry programs in private offices of nine selected dentists in the New York area. Patients are visited in their homes by a dental hygienist interviewer who collects personal interview data on preventive home practices and behavioral and attitudinal variables; observational data of preventive procedures and data on oral health status indicators.

This study has also been replicated using patients from the Dental Hygiene Clinic of Columbia University.* Findings on patient samples from these different settings indicated that:

(1) In both settings, the frequency of toothbrushing was high.

(2) Use of disclosing agents and changes in diet were infrequent.

(3) Observational ratings of plaque removal skills were generally favorable in both sample populations.

(4) Observational and self-reported compliance measures showed a high degree of agreement.

(5) Recency of contact with the dental office was positively associated with high scores on observed and self-reported indices of preventive practices, though time elapsed since instruction was not related to these indices.

A wide array of patient variables are being examined for their influence on preventive behaviors. Initial results indicate that sociodemographic characteristics are not related to indices of preventive practices while history of dental problems and dental treatment are positively associated. Clinic and private patient samples showed remarkable similarity in both rates and patterns of compliance and relationship of compliance to explanatory factors.

PUBLICATIONS:

Budner, N., Goldfarb, E., Nikias, M., Breakstone, R. and Agatstein, N.: Practice and patient factors in long-term compliance with

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preventive dental care. J. Dent. Res. 58A:164, 1979.

Budner, S., Nikias, M., Budner, N., Agatstein, N. and Goldfarb, E.: Intercorrelations among measures and dimensions of preventive dental compliance. J. Dent. Res. 58A:163, 1980 (abstract).

Nikias, M.K.: Patient education in preventively oriented dental practices. J. Dent. Res. 57A:338, 1978 (abstract).

Nikias, M.K.: Practice and patient factors in long term compliance with preventive dental care. J. Dent. Res. 58A:164, 1979 (abstract).

Nikias, M.K., Agatstein, N. and Budner, N.: Compliance over time with preventive oral home care regimens. J. Dent. Res. 58A:162, 1979 (abstract).

Nikias, M. and Budner, N.: Psychosocial correlates of compliance with preventive oral home care regimens. J. Dent. Res. 59:860, 1980 (abstract).

Nikias, M., Budner, N., Glassman, M., Turgeon, L.: Compliance with preventive oral home care regimens. J. Dent. Res. (In press).

* Project funded by the National Center for Health Services Research.

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F. DENTAL FEAR

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PROJECT TITLE: Control of Stress During Dental Procedures

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Norman L. Corah, Ph.D.
Department of Behavioral Science
School of Dental Medicine
State University of New York
Buffalo, New York 14226

PROJECT NUMBER: R01 DE-04494

PROJECT PERIOD: 6/76 - active

PURPOSE:

The long term goal of the research is to develop practical techniques for reducing stress in patients undergoing dental procedures. Various techniques to help patients control their perception of stress are being compared in order to evaluate which have the greatest efficacy during actual dental treatment. Several relaxation and distraction procedures have been compared. Characteristics of the patients are also being evaluated to determine if different techniques should be used with different types of patients.

METHODS AND FINDINGS:

This project includes a series of behavioral experiments conducted during actual dental treatment. Both physiological measures (e.g., heart rate, skin resistance) and behavioral measures (ratings of perceived discomfort, treatment preference ratings) are obtained and compared under various relaxation and distraction conditions.

Findings include the following:

(1) Taped relaxation instructions (but not taped factual material, read at a similar pace and vocal tone) had significant benefits.

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(2) Music distraction, whether controlled by the subject or not, had a negligible effect on patient self ratings and physiologic indicators; however, active distraction procedures, e.g., a video ping pong game, do reduce perceived discomfort during dental treatment.

PUBLICATIONS:

Corah, N.L., Bissell, G.D., and Illig, S.J.: Effect of perceived control on stress reduction in adult dental patients. J. Dent. Res. 57:74-76, 1979.

Corah, N.L., Gale, E.N., and Illig, S.J.: Psychological stress reduction during dental procedures. J. Dent. Res. 58:1347-1351, 1979.

Corah, N.L., Gale, E.N., and Illig, S.J.: The use of relaxation and distraction to reduce psychological stress during dental procedures. J. Am. Dent. Assoc. 98:390-394, 1979.

Corah, N.L.: Méthodes permettant de réduire la tension psychogique an cours des traitements dentaires, Medecine et Hygiene 38:1404-1405, 1980.

Corah, N.L., Gale, E.N., Pace, L.F., and Seyrek, S.K.: Relaxation and musical programming as means of reducing psychological stress during dental procedures. J. Am. Dent. Assoc. (In press).

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PROJECT TITLE: Effects of Physiological Feedback on Dental Fear

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Richard Hirschman, D.M.D., Ph.D.
Department of Psychology
Kent State University
Kent, Ohio 44242

PROJECT NUMBER: R01 DE-04769

PROJECT PERIOD: 3/78 - Active

PURPOSE:

The purpose of this study is to develop procedures which attenuate negative emotional experience associated with dental treatment. Specific objectives are to clarify the functional relationships among visceral cues, self-generated cognitions derived from visceral cues, and emotional experiences.

METHODS AND FINDINGS:

Students and adult volunteers who suffer from dental fears have participated in a series of experiments related to the project goals. In one series of experiments, behaviors are compared during actual and "false" physiological feedback. In other experiments, biofeedback is provided to patients in a simulated dental situation and during actual dental treatment in an effort to modify stress responses. Results include the following:

(1) Heart rate deceleration leads to lower reported unpleasantness; however, it is the perception of deceleration, not the fact, that is important.

(2) Decreased respiratory rate and decreased skeletal muscle activity also lead to reduced reported unpleasantness.

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PUBLICATIONS:

Clark, M. and Hirschman, R.: Effects of paced respiration on affective responses during dental stress. J. Dent. Res. 59:1533, 1980.

Harvey, F. and Hirschman, R.: The influence of extraversion and neuroticism on heart rate responses to aversive visual stimuli. Pers. and Indiv. Diff. 1:97-100, 1980.

Hirschman, R. and Favaro, L.: Individual differences in imagery vividness and voluntary heart rate control. Pers. and Indiv. Diff. 7:129-133, 1980.

Hirschman, R., Revland, P., Hawk, G. and Young, D.: Effects of dental anxiety and phase of treatment of discomfort during dental simulation. J. Dent. Res. 59:1064, 1980.

Hirschman, R., Young, D., and Nelson, C.: Physiologically based techniques for stress reduction. In B.D. Ingersoll & W.R. McCutcheon (Eds.): Clinical Research in Behavioral Dentistry. Morgantown, West Virginia University Foundation, 1979.

Hirschman, R., Melamed, L., and Oliver, C.: The psychophysiology of infancy. In B. Wolman and G. Stricker (Eds.): Handbook of Developmental Psychology. New York, Prentice Hall. (In press).

Hirschman, R. and Clark, M.: Bogus physiological feedback. In J.T. Cacioppo and R.E. Petty (Eds.): Soc. Psychophysiology. New York, Guilford Press. (In press).

Nelson, C., Young, D. and Hirschman, R.: The development of physiological control procedures for the reduction of anxiety. J. of Marketing/Management for Professions. (In press).

Hirschman, R. and Revland, P.: Effects of heart rate feedback on dental stress. J. Dent. Res. 58:323, 1979. (Abstract).

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PROJECT TITLE: Systematic Desensitization of Dental Fears

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

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Department of Basic Dental Science
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* Formerly at School of Dentistry, University of Florida, Gainesville, Florida 32601

PROJECT NUMBER: R01 DE-04143

PROJECT PERIOD: 3/75 - active

PURPOSE:

This project aims to develop behavioral techniques for reducing dental fear. Systematic desensitization and stress management are being compared to determine which approach better enables patients to meet appointments and cooperate with their dentists.

METHODS AND FINDINGS:

In systematic desensitization, fearful patients are asked to develop a hierarchy of fear (calling for an appointment, entering the dentist's office, sitting in the chair, hearing the drill, etc.). Next they are given training in relaxation. Finally they are desensitized by practicing relaxation as they visualize steps in the fear hierarchy. Their behavior is compared against various control groups.

For all subjects, data obtained included percent of the dentist's time spent in treatment, and the dentist's perception of the patient's cooperation. An examination of the patient's dental health and psychological orientation one year later is the primary method for determining which intervention works best.

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PUBLICATIONS:

Jackson, E.: Effective persuasion in dental practice. J. Amer. Soc. Prevent. Dent. 5:15-18, 1975.

Jackson, E.: Establishing rapport I. Verbal interaction. J. Oral Med. 30:105-110, 1975.

Jackson, E.: Stress in dentistry: Patient and practitioner. In the Dental Clinics of North America. Philadelphia, Pa., W. B. Saunders Company, 1977.

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PROJECT TITLE: The Assessment and Treatment of Fear in Dentistry

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

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Department of Psychology
Western Washington University
Bellingham, Washington 98225

PROJECT NUMBER: RO1 DE-00414

PROJECT PERIOD: 6/75 - 6/79

PURPOSE:

The goals of the study were: 1) to develop instruments for assessing fear of dental treatment, and 2) to make a multiple stage evaluative study of different techniques for the treatment of dental fear responses.

METHODS AND FINDINGS:

In the initial phase of this research, a self report survey assessing dental fear was developed and validated against various behavioral and physiological criteria. Phase two consisted of pilot testing fear reduction techniques for feasibility, efficiency, and effectiveness. The three treatment techniques were: 1) a variant of systematic desensitization, 2) symbolic modeling, and 3) participant modeling. The final phase of the study consisted of testing methods shown most effective in phase two. Findings include the following:

(1) In comparing antecedent dental experiences in high and low fear subjects, pain experience appears to be a less critical variable in the development of dental fear than previously thought. Pain per se does not seem to be the major cause of fear. Dentist behavior and characteristics play a significant role.

(2) Self report measures, physiological measures, and

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observational measures of overt behavior are not highly correlated as indicators of dental fear in adults.

(3) During two years following fear reduction treatment, 50%-87.5% of patients were able to return to regular dental care. Patients in the participant modeling group showed the highest return rate and expressed greatest satisfaction with the treatment they received. Subjects in a control group, (Positive Dental Experience) showed the lowest rate of return, although these differences among groups were not statistically significant.

PUBLICATIONS:

Bernstein, D. A.: Applications of social learning theory to fear of dentistry. In Ingersoll, B. D., Seime, R. J., and McCutcheon, W. R. (Eds.): Behavioral Dentistry. Morgantown, W.Va., West Virginia University Press, 1978, pp. 17-24.

Bernstein, D. A., Kleinknecht, R. A., and Alexander, L.D.: Antecedents of dental fear. J. of Public Health Dent. 39:113-124, 1979.

Bernstein, D. A. and Kleinknecht, R. A.: Comparative evaluation of three social learning approaches to the reduction of dental fear. In Ingersoll, B. D. and McCutcheon, W. R. (Eds.): Clinical Research in Behavioral Dentistry. Morgantown, W.Va., West Virginia University Press, 1980, pp. 35-49.

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Kleinknecht, R. A.: Fear of dentistry: Its development, measurement and implications. In Weinstein, P. (Ed.): Advances in Behavioral Research in Dentistry. University of Washington Press, 1978, pp. 5-16.

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Kleinknecht, R. A. and Bernstein, D. A.: Short term treatment of dental avoidance. J. of Behavior Therapy and Experimental Psychiatry 10:311-315, 1979.

Kleinknecht, R. A. and Bernstein, D. A.: Fear assessment in the dental office. In Ingersoll, B.D. and McCutcheon, W.R., (Eds.): Clinical Research in Behavioral Dentistry. Morgantown, W.Va., West Virginia University Press, 1980, pp. 17-34.

VanBuren, J., and Kleinknecht, R. A.: An evaluation of the McGill pain questionnaire for use in dental pain assessment. Pain 6:23-33, 1979.

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PROJECT TITLE: Pain Tolerance in the Treatment of Dental Fear

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Robert K. Klepac, Ph.D.
Department of Psychology
North Dakota State University
Fargo, North Dakota 58102

PROJECT NUMBER: R01 DE-04976

PROJECT PERIOD: 4/78 - active

PURPOSE:

The primary objective of this research is to study pain toler ance in the treatment of dental fear. A secondary objective is tc examine differences between fearful and non-fearful patients in pain thresholds and other variables in order to better understand origins and correlates of dental fear.

METHODS AND FINDINGS:

Various fear reduction procedures are being tested to identif stress coping strategies and techniques which change pain tolerance levels in patients fearful of dental procedures. Included in this study is evaluation of the components of Pain Tolerance Training as they influence response to laboratory-induced pain. The study assesses relative effectiveness of procedures for reducing adverse reactions to dentistry among avoidant and highly fearful dental patients.

In a series of related experiments, this project is studying both college students who rate themselves as "high fear" or "low fear" with respect to dental treatment and actual dental patients. Initial data suggests that routine dental treatment is seldom perceived as painless, but is seen as low in intensity of pain compared with experimentally produced pain.

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PUBLICATIONS:

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Klepac, R. K., Hauge, G., Dowling, J., and McDonald, M.: Pain Tolerance and Dental Fear, Proceedings of the Second National Conference on Behavioral Dentistry. University of West Virginia, 1980.

Klepac, R. K., McDonald, M., Hauge, G. and Gowling, J: Differential response to pain among subjects high and low in fear of dentistry. J. of Behav. Med. (in press).

Klepac, R. K., Dowling, J., and Hauge, G.: Sensitivity of the McGill Pain Questionnaire to Intensity and Quality of Laboratory Pain, Pain. (in press).

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PROJECT TITLE: Behavioral Approaches to Pain in Pedodontics

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Barbara G. Melamed, Ph.D.
Department of Clinical Psychology*
University of Florida
Gainesville, Florida 32610

*formerly Case Western Reserve University
2040 Adelbert Road, Cleveland, Ohio 44106

PROJECT NUMBER: RO1 DE-05305

PROJECT PERIOD: 6/75 - active

PURPOSE:

The overall goals are to study methods for assessing and modifying fear in children undergoing dental restorative treatment. Other objectives are:

(1) To evaluate the effectiveness of alternative dental management strategies and their relationships to fear and disruptive behavior in pediatric patients.

(2) To compare methods developed to train dental students and practitioners in the prediction of stress responses and the application of appropriate psychological management procedures.

METHODS AND FINDINGS:

Behavioral techniques derived from learning theory are used in the project. The study's multidimensional approach to the assessment of fear in children includes subjective reports, behavioral observations and psychophysiological responses. Both "between subject" and "intrasubject" analyses are performed. Some of the results of the research are:

(1) Children observing a peer model, as compared with those

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seeing a demonstration film, exhibited significantly less disruptive behavior during actual treatment. The greatest reduction in observed anxiety occurred in the 6-8 year olds who had viewed the peer model.

(2) A relationship was found between the amount of information presented and degree of anticipatory anxiety. The age of the child seemed to interact with the optimal amount of information.

(3) The results suggest that specific information about the procedures to be undertaken, presented within a modeling context, decrease subjective anxiety and produce greater cooperation during treatment.

PUBLICATIONS:

Johnson, S. and Melamed, B. G.: Assessment and treatment of fears in children. In Lahey, B. and Kazdin, A. (Eds.): Advances in Clinical Child Psychology, New York, Plenum Publishing, 1978, pp. 107-139.

Hawes, R., Melamed, B. G. and Hutcherson, S.: Relationship between children's dental fears and dentist's use of different reinforcement strategies. J. of Dent. Res. 55:1039, 1976.

Hutcherson, S., Melamed, B. G. and Hawes, R.: Imitation of a filmed model: Does it exist in a dental setting? J. of Dent. Res. 55:1042, 1976.

Melamed, B. G., Hawes, R., Heiby, E., and Gluck, J.: The use of filmed modeling to reduce uncooperative behavior of children during dental treatment. J. of Dent. Res. 54:797-801, 1975.

Melamed, B. G., and Siegel, L.: Reduction of anxiety in children facing hospitalization and surgery by use of filmed modeling. J. of Consult. and Clin. Psychol. 43:511-521, 1975.

Melamed, R., Weinstein, D., Hawes, R., and Borland, M.: Reduction of fear-related dental management problems using filmed modeling. J. of the American Dental Assoc. 90:822-826, 1975.

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Melamed, B. G., Hawes, R. and Hutcherson, S.: Peer modeled fear behaviors during local anesthesia and its influence on childrens' dental examination behavior. J. of Dent. Res. 55:1041, 1976.

Melamed, B. G., Meyer, R. K., Gee, C. and Soule, L.: The influence of time and type of preparation on children's adjustment to hospitalization. J. of Ped. Psychol. 1:31-37, 1976.

Melamed, B. G.: Psychological preparation for hospitalization. In Rachman, S. (Ed.): Contributions in Medical Psychology. Oxford, Pergamon Press, 1977.

Melamed, B. G., Hawes, R., Hutcherson, S. and Fleece, L.: Fear level, previous experience and the effects of film modeling in dentistry, J. of Dent. Res. 56:431, 1977.

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Melamed, B. G., Fleece, L., Hutcherson, S., and Fox, L.: Contingency management by dentists to reduce disruptive behavior in patients. J. of Dent. Res. 56:B-159, 1978.

Melamed, B. G.: Behavioral approaches to fear in natural settings: Dentistry. In Hersen, M. and Eisler, R. (Eds.): Progress in Behavior Modification. New York, Academic Press, 1979, pp. 171-203.

Melamed, B. G., Bennett, C. G., Hill, C. J. and Ronk, S. L.: Strategies for patient management in pediatric dentistry. In Ingersoll, B. and McCutcheon, W. (Eds.): Proceedings of the Second National Conference of Behavioral Dentistry. West Virginia University Press, 1979.

Melamed, B. G. and Siegel, L.: Behavioral Medicine: Practical Applications in Health Care. New York, Springer Publishing Co., 1980.

Melamed, B. G.: Reduction of medical fears: An information processing analysis. In Boulougouris, J. (Ed.): International Symposium on Learning Theory Applications in Psychiatry. New York, J. Wiley and Sons. (In press).

Zabin, M. and Melamed, B.G.: Relationship between parental discipline and children's ability to cope with stress. J. of Behav. Assess., 1980.

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PROJECT TITLE: Young Child's Response to Dental Stress

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Larry L. Venham, D.D.S., Ph.D.
Department of Pediatric Dentistry
University of Connecticut Health Center
Farmington, Connecticut 06032

PROJECT NUMBER: RO1 DE-04409

PROJECT PERIOD: 4/77 - 3/81

PURPOSE:

The project studied the responses of young children to dental stress. It included three aims: first, to describe what children do at the first few dental visits; second, to study developmental factors associated with high and low stress-tolerance; and third, to examine procedures for modifying responses to stress.

METHODS AND FINDINGS:

Behaviors of children between two and five years of age were evaluated during an initial dental visit and during repeat visits at 6 month intervals. Children selected for the study included both those who need restorations and those who did not; hence behavioral responses to more stressful and less stressful situations could be compared. Responses measured included heart rate, skin conductance, EMG, picture tests, human figure drawing, and clinical ratings of anxiety and cooperative behavior. A multivariate analysis for repeated measures was used to test for significant effects.

Children's responses deteriorated from first through third visits, and improved at the fourth. At recall 6 months later, responses were similar to the initial visit. Findings suggested that experience reduces children's apprehensiveness to the dental situation but sensitizes them to specific procedures

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such as injections. The longitudinal aspects of this design provided unique data concerning children's response to dental treatment at various developmental stages. The investigator sees his results as supporting a Piagetian formulation of cognitive development.

PUBLICATIONS:

Sonnenberg, E. and Venham, L. L.: Human figure drawings as a measure of the child's response to dental visits. J. Dent. Child. 44:438-442, 1977.

Venham, L. L., Bengston, D., and Cipes, M.: Pre-school child's response to sequential dental visits. J. Dent. Res. 56:454-459, 1977.

Venham, L. L. and Quatrocelli, S.: The pre-school child's response to specific repeated dental procedures. J. Dent. Res. 56:734-738, 1977.

Venham, L. L., Bengston, D., and Cipes, M.: Parent's presence and the child's response to dental treatment. J. Dent. Child. 45:213-217, 1978.

Venham, L.: The effect of mother's presence on child's response to dental treatment. J. Dent. Child. 46:219-225, 1979.

Venham, L, Murray, P., and Gaulin-Kremer, E.: Personality factors affecting the pre-school child's response to dental stress. J. Dent. Res. 58:2046-2051, 1979.

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PROJECT TITLE: Dentist Communication Variables and Fear in Children

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Philip Weinstein, Ph.D.
Department of Community Dentistry
School of Dentistry
University of Washington
Seattle, Washington 98195

PROJECT NUMBER: R01 DE-04770

PROJECT PERIOD: 1/79 - active

PURPOSE:

The purpose of the research is to identify effecive and non-effective communication patterns between dental practitioners and child patients. Of special interest are communication patterns which characterize successful interaction, i.e., maximally cooperative and minimally disruptive patient behaviors. Another objective is to determine the effects of variables, associated with the dental practitioner (e.g., confidence and tolerance for various child behaviors) upon fear related behaviors.

METHODS AND FINDINGS:

Thirty dentists and sixty preschool aged children are participating. Videotapes of a series of two dental visits for each child patient are scored using real-time behavior codings. Fear-related behaviors and patterns of dentist-patient communication are coded during nine phases of treatment (chair placement, visual examination with mirror and explorer, taking radiographs, pumice proplylaxis, topical fluorides, injections, rubber dam placement, cavity preparation, placement of restorative materials and finishing of restorations). The research methodology used permits analysis of sequential behaviors.

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Preliminary findings indicate that:

(1) None of the empathy behaviors were as effective as direction and reinforcement. When expressed feelings are denied or ignored, or when the child was verbally criticized, probabilities for fear-related behavior were found to be considerably higher.

(2) Fear-related behaviors that interferred with treatment varied significantly between phases. More importantly, length of a given procedural phase was found to be related to fear related behaviors; the longer the phase, the greater the percentage of time during the phase consisting of fear-related behaviors.

Preliminary results suggest that patterns of child behavior, and the effects of provider behavior, can be identified utilizing sequential analyses.

PUBLICATIONS:

Weinstein, P.: Identifying patterns of behavior during treatment of children. In Ingersoll, B.D. and McCutcheon, W.R. (Eds.): Clinical Research in Behavioral Dentistry. Morgantown, W.Va. University Press, 1980, pp. 115-140.

Weinstein, P., Domoto, P., Getz, T., and Enger, R.: Reliability & validity of a measure of confidence in child management. Ped. Dent. 2:7-9, 1980.

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G. PROCESSES AND OUTCOMES OF DENTAL CARE

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PROJECT TITLE: Dental Pain, Acupuncture, and Psychological Variables

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

William B. Chan, D.D.S.
Department of Anesthesia
Massachusetts General Hospital
Boston, Massachusetts

PROJECT SPONSOR:

Gene M. Smith, Ph.D.
Department of Anesthesia
Massachusetts General Hospital
Boston, Massachusetts

PROJECT NUMBER: 1F32 DE-5057-01

PROJECT PERIOD: 8/1/76 - 7/31/77

PURPOSE:

The overall purpose of this project was research training related to behavioral aspects of pain. Pilot studies focused on 1) comparing the sensory effect of needle insertion at traditionally defined acupuncture points vs. placebo points, and 2) evaluating the effects of acupuncture on selected therapeutic interventions (e.g., deep scaling and curettage), used in the treatment of periodontal disease.

METHODS AND FINDINGS:

Subjects in the primary study were dental patients scheduled to receive periodontal treatment including deep scaling and curettage. The investigators found that needle insertion at traditionally defined acupuncture points was reported to hurt more and be more distinctive than was needle insertion at placebo points.

Pilot work was also done assessing the role of sex and cultural factors in sensitivity to the acupuncture effect.

PUBLICATIONS:

None.

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PROJECT TITLE: Hypnosis as an Anesthetic in Dentistry

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Leslie M. Cooper, Ph.D.
Department of Psychology
University of Utah
Salt Lake City, Utah 84112

PROJECT NUMBER: RO1 DE-3651

PROJECT PERIOD: 1/73 - 12/74

PURPOSE:

The purpose of this study was to study the relationship between responsiveness to hypnotic suggestions and hypnotic anesthesia in dental treatment. Anxiety, expectation about hypnotic effects, and depth of hypnosis were measured and used as covariates.

METHODS AND FINDINGS:

The Stanford hypnotic susceptibility scale, ultrasonic pulp tests, Voevdosky scale for testing tooth sensitivity, Spielberger's state-trait anxiety inventory, Tart's scale of hypnotic depth, an expectation rating scale, and a subjective pain scale were used. Subjects were 25 dental patients receiving private dental care. Subjects underwent two similar treatments, receiving either a pharmacologic or hypnotic anesthesia. Subjective evaluations of the results were obtained from both patients and dentist.

Twelve subjects were highly susceptible to hypnosis, six were moderately susceptible and seven had low susceptibility. Fourteen patients took dental treatment under hypnosis and reported no pain, while seven reported pain and requested chemical anesthesia. Four terminated the hypnosis and asked for an analgesic within one minute of the start of the treatment.

Expectation could not be separated unequivocally from high

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susceptibility and appeared to be irrelevant to the situation. However, highly susceptible patients with high expectations still reported more pain under hypnosis than under chemical anesthesia. Nevertheless these patients subjectively preferred hypnosis, probably because their depth of anesthesia closely approached that of chemical anesthesia with no after effects.

An unusually large percentage of patients in this study claimed satisfaction with hypnosis (56 percent) as compared with other studies.

PUBLICATIONS:

None

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PROJECT TITLE: Comparing the Efficacy of Conscious Sedation Drugs

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Stephen A. Cooper, D.M.D., Ph.D.
Associate Dean for Research and Postgraduate Studies
Department of Oral Surgery
College of Medicine and Dentistry of New Jersey
New Jersey Dental School
Newark, New Jersey 07103

PROJECT NUMBER: R23 DE-05420

PROJECT PERIOD: 9/78 - active

PURPOSE:

Objectives include: 1) identifying psychomotor and memory tests which are useful clinically in evaluating patients' post-operative recovery from intravenous sedation, 2) demonstrating the efficacy of psychomotor or memory testing in assessing either temporal effects of a single drug or additive or synergistic effects of combination drug therapy.

The investigator anticipates that this research will substantially expand clinically applicable knowledge concerning the temporary psychomotor and mental effects of intravenous sedation drugs.

METHODS AND FINDINGS:

A battery of psychometric tests including word memory, Seguin form board, digit symbol, block design, and reaction time is used to assess psychomotor and memory function in normal college student volunteers; subjects are tested under either control conditions or drug-administration conditions.

In the initial study in this series, each subject was given a baseline or pre-drug test session and then retested 30, 90, and 150 minutes later. The drug group received 17-28 mg.

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of diazepam. The group which received diazepam showed both psychomotor and memory deficits persisting throughout the 150 minute evaluation; even after subjects appeared to be recovered from the effects of diazepam, significant psychomotor and memory impairments were evident in psychometric testing.

Further studies showed that dosages of diazepam as small as 5 mg. resulted in significant anterograde amnesia (memory loss for events following drug administration). Behavioral effects of the drugs meperidine and butorphanol also are being assessed.

Ongoing studies are examining the behavioral effects of various drugs and drug combinations, with particular emphasis on the use of agonist-antagonist opioid drugs in combination with diazepam. The overall goal will be to develop an IV sedation technique that provides effective sedation, analgesia, and amnesia having minimal postoperative carryover effects on cognitive functions such as memory and psychomotor performance.

PUBLICATIONS:

Cooper, S.A., Anthony, J., Mopsik, E., Moore, M., Sullivan, D. and Kruger, G.O.: A technique for investigating the intensity and duration of psychomotor impairment after intravenous diazepam. Oral Surg., Oral Med., Oral Path. 45:493-502, 1978.

Cooper, S.A., Breen, J.F. and Giuliani, R.L.: Replicate studies comparing the relative efficacies of aspirin and indoprofen in oral surgery out-patients. J. Clin. Pharmacol. 19:151-159, 1979.

Cooper, S.A. and Gottleib, S.: The relative efficacy of zomepirac sodium compared to an APC/codeine combination. J. Clin. Pharmacol. 20:230, 1980.

Cooper, S.A., Kruger, G.O., Reynolds, D. and Gottlieb, S.: An analgesic relative potency assay comparing zomepirac sodium and aspirin. J. Clin. Pharmacol. 20:98-106, 1980.

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Cooper, S.A., Breen, J.F. and Giuliani, R.L.: The relative efficacy of indoprofen compared with opioid-analgesics combinations. J. Oral Surgery. (In press).

Dionne, R. and Cooper, S.A.: Delaying the onset of postoperative dental pain by pretreatment with ibuprofen. Oral Surg., Oral Med., Oral Path. 45:851-856, 1978.

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PROJECT TITLE: Clinical Pharmacology of Drugs Used to Sedate Dental Outpatients

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Paul J. Desjardins, D.M.D.
Department of Pharmacology
Georgetown University School of Medicine
Washington, D. C. 20007

PROJECT SPONSOR:

William B. Beaver, M.D.
Departments of Pharmacology and Anesthesia
Georgetown University
Washington, D. C 20007

PROJECT NUMBER: F32 DE-05138

PROJECT PERIOD: 7/80 - active

PURPOSE:

The overall objective of this study is to develop a human model for evaluating the effects of individual sedative drugs and drug combinations on psychomotor performance, learning and functional memory. The specific goals of the project are:

(1) To improve upon current methods for the evaluation of drugs used for conscious sedation.

(2) To evaluate drug effects on psychomotor performance and learning behaviors.

(3) To evaluate both long-term and short-term memory effects of drugs used in conscious sedation.

(4) To correlate plasma concentration of drugs with clinical effects.

(5) To evaluate the overall efficacy of these drugs relative to onset, peak, duration and quality of sedation.

(6) To evaluate the contribution of each drug of commonly used multi-drug combinations to overall efficacy.

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METHODS AND FINDINGS:

A previous pilot study by Dr. Cooper focused on selecting the most appropriate tests for measuring psychomotor performances and memory following administration of a drug for conscious sedation (Diazepam) to nonsurgical dental patients. The current project expands this study into clinical settings, using both objective and subjective testing measures to provide a comprehensive measure of drug effects at the time of surgery and for several hours postoperatively.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Psychophysiological Assessment of Intravenous Sedation*

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Raymond Dionne, D.D.S., Ph.D.**
Neurobiology and Anesthesiology Branch
Clinical Pain Section
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: ZO1 DE-00132

PROJECT PERIOD: 1974 - active

PURPOSE:

The purpose of this project is to evaluate the efficacy and clinical toxicity of drugs given to dental outpatients to alleviate apprehension and pain associated with dental procedures. Measures of efficacy (e.g., relief of anxiety, analgesia, amnesia and patient cooperation) and of clinical toxicity assessed (e.g., arterial oxygen saturation, respiratory rate, blood pressure, heart rate, impairment of psychomotor and cognitive function and non-specific central nervous system depression) were obtained. By combining the results of these individual assessments, it is possible to quantify the relationship between efficacy and clinical toxicity and determine the therapeutic ratio for various agents and combinations.

METHODS AND FINDINGS:

Patients undergoing the removal of impacted third molars serve as experimental subjects. A major aspect of this research has been assessment of the physiological effects of four commonly employed intravenous sedative regimens: diazepam, diazepam plus fentanly, diazepam plus methohexital, and diazepam, fentanyl and methohexital.

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Another aspect has been evaluation of newly developed description scales for assessing subjective effects of anti-anxiety agents. Previously validated differential descriptor scales for sensory intensity, unpleasantness and painfulness are administered along with ordinal ranking scales to assess the amount of pain and apprehension experienced during surgery. Testing is performed prior to surgery, after placebo administration and following administration of active drugs.

The differential descriptor scales for assessing the subjective effects of drugs employed for sedation appear to be sensitive for differentiating between drug groups. Diazepam, a relatively specific anti-anxiety agent, caused the greatest relief of anxiety and increase in relaxation when compared to placebo. Diazepam also decreased the painfulness of the procedure by decreasing the unpleasantness but not the perceived intensity of painful surgical stimuli. Preliminary findings suggest that these scales may be useful for assessing the individual contribution different drugs make to the overall effects of sedative drugs.

PUBLICATIONS:

Driscoll, E.J., Gelfman, S.S., Sweet, J.B., Butler, D.P., Wirdzek, P.R., and Medlin, T.: Thrombophlebitis after intravenous use of anesthesia and sedation: its incidence and natural history. J. Oral Surg. 37:809-815, 1979.

Gelfman, S.S., Gracely, R.H., Driscoll, E.J., Butler, D.P., Sweet, J.B., and Wirdzek, P.R.: Recovery following intravenous sedation during dental surgery performed under local anesthesia. Anesth. Analg., October 1980.

Gelfman, Stephen S., Gracely, Richard H., Driscoll, E. J., Wirdzek, Peggy R., Sweet, James B., and Butler, Donald P.: Conscious sedation with intravenous agents: An amnesic study. J. Oral Surg. 36:191-197, March 1978.

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Dionne, R.A., Driscoll, E.J., Gelfman, S.S., Sweet, J.B., Butler, D.P., and Wirdzek, P.R.: Cardiovascular and respiratory response to intravenous diazepam fentanly and methohexital in dental outpatients. J. Oral Surg. (In press).

* Previously titled "Psychophysiological Evaluation of Intravenous Sedation for Ambulatory Oral Surgery"

** Previous principal investigator: Stephen S. Gelfman, D.D.S.

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PROJECT TITLE: Evaluation of Etidocaine and Flurbiprofen for Inhibition of Post-Operative Pain

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Raymond A. Dionne, D.D.S., Ph.D.
Neurobiology and Anesthesiology Branch
Clinical Pain Section
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00286

PROJECT PERIOD: 1979 - active

PURPOSE:

The primary objectives of these studies are evaluation of the efficacy of several analgesics and a long-acting local anesthetic in inhibiting postoperative pain. The behavioral component of this research involves determining the sensitivity of scales for the measurement of pain (differential descriptor scales and verbal descriptor scales) compared to traditional analgesic scales.

METHODS AND FINDINGS:

Subjects are patients in need of bilateral extraction of impacted third molars; they are selected to participate only if the anticipated degree of difficulty of the extractions is judged approximately equal on both sides. Subjects receive one of the two treatments under study on a random basis at the first appointment and the alternative treatment at a second appointment, two to four weeks later.

Subjects complete the pain assessment questionnaire prior to surgery as a baseline observation and also rate their pain

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intensity hourly starting two hours after the initial pretreatment dose and continuing to eight hours after the initial dose. Traditional measures of analgesic activity include ordinal ranking scales (none, slight, moderate or severe pain), a global evaluation scale, and a visual analog scale. Newer measures of analgesia being employed are the verbal descriptor scales and differential descriptor scales previously developed and validated at NIDR. Side effects are also recorded and patients indicate which of the two treatments they preferred at the end of the second appointment.

Preliminary data suggest that flurbiprofen results in greater inhibition of postoperative pain than does acetaminophen. Preliminary data also suggest that the newer verbal descriptor scales are more sensitive measures of analgesic activity than are traditional ordinal ranking scales.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Assessment of Clinical and Experimental Dental Pain

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Marc W. Heft, D.M.D.
Neurobiology and Anesthesiology Branch
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT SPONSOR:

Richard H. Gracely, Ph.D.
Neurobiology and Anesthesiology Branch
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: F32 DE-05174*

PROJECT PERIOD: 1/12/80 - active

PURPOSE:

This study extends psychophysical methods for the investigation of pain and investigates the use of these methods in the study of the effects of analgesics on pain. Laboratory as well as various types of clinical pain will be studied.

METHODS AND FINDINGS:

This research follows up work by Dr. Richard Gracely who developed methods of pain assessment in laboratory settings. The method involves the assessment of the sensory intensity and unpleasantness of pain. Using this previously validated scale, 33% nitrous oxide was compared to active and inactive placebos in a double-blind study. It was found that nitrous oxide reduced perceived sensory intensity but not the unpleasantness of electrical tooth-pulp stimulation.

Chronic myofascial pain dysfunction patients have scaled the intensity and unpleasantness of both their clinical pain

*This is a continuation of previous project number Z01 DE-00246 NA.

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and electrical stimulation. By having patients match the pain from known levels of electrical stimulation to clinical pain, the reliability and validity of clinical pain assessment has been determined.

In a later study, verbal scales were also used to assess MPD pain at two separate experimental sessions. Pain was assessed before and after the intravenous administration of either a narcotic (fentanyl) or saline placebo, in a double-blind, crossover design. Results of this study showed a significant reduction in pain unpleasantness with a non-significant reduction in pain intensity following administration of fentanyl.

This finding contrasts with a previous study which showed that fentanyl reduced the pain intensity, but not unpleasantness, of electrical tooth pulp stimuli in normal volunteers.

PUBLICATIONS:

Heft, M.W., Gracely, R.H., Dubner, R. and McGrath, P. A.: A validation model for verbal descriptor scaling of human clinical pain. Pain, 9:363-373, 1980.

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PROJECT TITLE: Dental Anesthesia: A Psychophysiological Evaluation

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Lindsay M. Hunt, D.D.S., Ph.D.
Department of Anesthesiology
School of Dentistry
Emory University
Atlanta, Georgia 30322

PROJECT NUMBER: RO1 DE-04003

PROJECT PERIOD: 3/75 - 3/77

PURPOSE:

The purpose of this project was to compare effects of several methods of anesthesia on the dental pain experience. Both physiologic and emotional factors were studied in evaluating effects of anesthesia.

METHODS AND FINDINGS:

Signal detection (sensory decision) theory was used to compare effects of nitrous oxide and acupuncture analgesia on sensory and response bias shifts occurring during tooth stimulation. Other physiological monitoring was performed using standard techniques.

Results from this use of signal detection were inconclusive. Contrary to the commonly held belief that adequate stimulation of teeth only results in pain, this investigation concluded that a prepain sensation can be realized, and the ratio of prepain to pain is consistent. Although response bias shifts and discrimination changes were seen, no consistent results were found from the use of acupuncture or nitrous oxide to elevate pain threshold for experimental pain.

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PUBLICATIONS:

Hunt, L.M., Sung, Y.F., and Anderson, K.V.: Evaluation of cardiopulmonary and reaction time effects of nitrous oxide sedation. Paper presented at the 56th General Session of the Int. Assoc. for Dent. Res., Washington, D.C., March 16, 1978. (Abstract #187).

Hunt, L.M., Sung, Y.F. and Anderson, K.V.: Dental anesthesia: a psychophysiological evaluation. Presented at AADR 58th General Session, Los Angeles, CA, March, 1980. (Abstract #431).

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PROJECT TITLE: Craniofacial Anomalies: Treatment Evaluation

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Jeffrey P. Krischer, Ph.D.
Department of Oral Health Service
School of Dental Medicine
Tufts University
Boston, Massachusetts 02111

PROJECT NUMBER: R01 DE-04551

PROJECT PERIOD: 3/78 - active

PURPOSE:

The objective of this research is to develop and test analytic methodologies to aid in the evaluation of treatment decisions and outcomes in the management of craniofacial anomalies. Mathematical models are being formulated to measure and evaluate patient outcomes. The project also is attempting to quantify the clinical and psychosocial values associated with varying levels of habilitative status related to each dimension of a treatment outcome (i.e., speech, cosmetics) and its status prior to treatment. It is also exploring the ways by which to aggregate individually-held judgments to form the basis for group or team decision-making.

METHODS AND FINDINGS:

Based on concepts of decision theory, scaling techniques are being developed to explicitly include perceptions of risk or uncertainty as they affect the consideration of treatment alternatives for patients with craniofacial anomalies, in particular, cleft lip and cleft palate. These techniques focus on describing the subjective process through which decisions are made from among risky alternatives. The research involves numerous clinicians from different institutions providing services for children born

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with craniofacial anomalies. An important result of this study is the development of a formula describing threshold probabilities. This formula makes mathematical approaches more easily understood by those with limited training in the field. Consequently, it increases the probability that these mathematical approaches will be utilized in clinical settings.

PUBLICATIONS:

Krischer, J. P.: A decision analytic approach to cleft palate treatment evaluation. Cleft Palate J., Vol. 17:319-325, 1980.

Krischer, J. P.: An annotated bibliography of decision analytic applications to health care. Operations Research, Vol. 28:97-113, 1980.

Dixon, V. L. and Krischer, J. P.: The application of quantitative methods to the evaluation of alternative treatments. (In press).

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PROJECT TITLE: Treatment of Temporomandibular Joint Pain

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Elliot N. Gale, Ph.D.
Department of Behavioral Sciences
School of Dentistry
State University of New York at Buffalo
Buffalo, New York 14226

PROJECT NUMBER: RO1 DE-04358

PROJECT PERIOD: 5/75 - active

PURPOSE:

The purpose of this project is to evaluate immediate and long-term symptom reduction in myofacial pain dysfunction (MPD) syndrome patients following treatment with various biofeedback procedures. Specific aims include: 1) validating the effectiveness of EMG biofeedback treatment of MPD syndrome pain, 2) determining which patient variables (e.g., anxiety, hostility) are associated with differential response to treatment, and 3) comparing alternative biofeedback procedures for their effect in reducing pain associated with myofacial pain dysfunction (MPD) syndrome.

METHODS AND FINDINGS:

All subjects included in this series of experiments 1) have beer diagnosed as having MPD pain for at least two years and 2) have received at least one other prior dentally-oriented treatment (e.g., biteplate appliances, occlusal adjustment) which was unsuccessful. Most subjects had experienced multiple prior unsuccessful treatments.

This series of experiments compares various forms and combinations of biofeedback training (e.g., use of auditory feedback vs. use of visual feedback; laboratory EMG training combined with a

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home relaxation training program vs. laboratory biofeedback training alone). Outcome measures include the number of biofeedback training sessions required before patients' report complete pain relief, patients' ratings of pain reduction, and physiological indices such as EMG recordings of masseter muscle activity on "painful" and "non-pain" sides of the face.

Overall, slightly over half (50-60%) of these MPD patients with previously intractable oral-facial pain rate themselves as "totally cured" or "significantly improved" both following biofeedback training and at long-term followup. All patients on whom data is reported have been followed at least 6 months after the completion of biofeedback training, with most patients now followed up to 3 years post-treatment.

PUBLICATIONS:

Carlsson, S.G. and Gale, E.N.: Biofeedback treatment for muscle pain associated with the temporomandibular joint. Beh. Therapy and Exp. Psych. 7:383-385, 1976.

Carlsson, S.G. and Gale, E.N.: Biofeedback in the treatment of long term temporomandibular joint pain: An outcome study. Biofeedback and Self Regulation 2:161-171, 1977.

Funch, D.P. and Gale, E.N.: Factors associated with nocturnal bruxism and its treatment. J. of Behav. Med. (In press).

Gale, E.N.: Psychological characteristics of long term female temporomandibular joint pain patients. J. Dent. Res. 57:481-483, 1978.

Gale, E.N. and Carlsson, S.G.: Frustration and temporomandibular point pain. Oral Surg., Oral Med., Oral Patho. 45:39-43, 1978.

Gale, E.N.: Biofeedback for TMJ pain. In B.D. Ingersoll and W.R. McCutcheon (Eds.): Clinical Research in Behavioral Dentistry, W.Va. University Press, Morgantown, W.Va., 1979.

Gale, E.N. and McCall, W.D., Jr.: The effect of electrode placement and instrumentation of the masseteric silent period. J. Dent. Res. (In press).

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Gale, E.N.: Behavioral Sciences. In Hine, M.K. and Phillips, R. (Eds.): Review of Dentistry, 7th Ed., St. Louis, Mo. (In press).

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PROJECT TITLE: Assessment and Evaluation of Clinical Pain, and an Evaluation of Pain-Control Agents

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Richard H. Gracely, Ph.D.
Clinical Pain Section
Neurobiology & Anesthesiology Branch
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: ZO1 DE-0133

PROJECT PERIOD: 1977 - active

PURPOSE:

Purposes are:

(1) to assess psychophysical methods of measuring experimental pain induced by various types of stimulation, mechanical heat, electrocutaneous, and electric stimulation of toothpulp

(2) to assess measures of clinical pain in a dental setting

(3) to determine the validity of a model of experimental pain

(4) to evaluate pharmacological and nonpharmacological agents for control of pain.

METHODS AND FINDINGS:

Magnitude estimation, category scaling, cross-modality matching and verbal descriptor measures of sensory intensity and unpleasantness were used for purpose 1; pain questionnaires and sensory matching methods were used for purpose 2; a comparison of experimental and clinical responses to pain were made for purpose 3; and diazepam, fentanyl, nitrous oxide, aspirin and codeine were the agents evaluated in purpose 4.

Verbal descriptors proved to be the only way to distinguish sensory intensity of pain from its degree of unpleasantness or "affect"; unpleasantness responses were lowered after the admin-

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istration of diazepam, a tranquilizer, but sensory intensity responses were unaltered. In contrast to the effects of diazapem, fentanyl reduced the intensity of responses to verbal descriptors of sensory intensity, but did not change the perceived degree of unpleasantness of the pain as reported in the effective descriptors.

PUBLICATIONS:

Gracely, R.H., Dubner, R., McGrath, P., and Heft, M.: New methods of pain measurement and their application to pain control. Int. Dent. J. 28:52-65, 1978.

Gracely, R.H., McGrath, P., and Dubner, R.: Ratio scales of sensory affective verbal pain descriptors. Pain 1:5-18, 1978.

Gracely, R.H., McGrath, P., and Dubner, R.: Validity and sensitivity of ratio scales of sensory and affective verbal pain descriptors: manipulation of affect by diazepam. Pain 1:19-29, 1978.

Gracely, R.H., Dubner, R., McGrath, P.A.: Narcotic analgesia fentanyl reduces the intensity but not the unpleasantness of painful tooth pulp sensations. Science 203:1261-1263, 1979.

Gracely, R.H.: Psychophysical assessment of human pain. In J.J. Bonica, J.C. Liebeskind and D. Albe-Fessard (Eds.): Advances in Pain Research and Therapy, Vol. 3, Raven Press, New York, 1979, pp. 805-824.

Gracely, R.H.: Pain measurement in man. In L. Ng and J.J. Bonica (Eds.): Pain, Discomfort, and Humanitarian Care, Elsevier, North Holland, 1980, pp. 111-137.

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PROJECT TITLE: Psychomotor Impairment Related to N_2O Exposure

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Paul Moore, D.M.D., Ph.D.
Department of Oral Biology and Pathophysiology
Harvard School of Dental Medicine
Harvard University
Boston, Massachusetts 02115

PROJECT NUMBER: R23 DE-5507

PROJECT PERIOD: 8/80 - active

PURPOSE:

In the last decade there has been a dramatic increase in the use of nitrous oxide for sedation in dentistry. It is currently estimated that 30,000 dentists use inhalation sedation. When administered with at least 25% 02, use of N_2O sedation relieves much of the fear and anxiety of dental procedures.

The overall objective of this proposed research project is to characterize the psychomotor impairment that is induced by exposure to N_2O. Initially alterations in human performance will be evaluated during exposure to various concentrations of N_2O and a dose versus impaired response relationship will be determined. In addition, the concentration of N_2O that first induces change in performance (impairment threshold) will also be determined.

METHODS AND FINDINGS:

An audiovisual task simulating the visual and auditory patterns that must be monitored by an anesthesiologist, earlier was shown to be a sensitive test of the behavioral effects of trace anesthetics. The present research uses a comparable test involving measurement of reaction time to visual (light) and auditory (tone) signals. Subjects are required to depress one of four buttons when a change

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occurs in either signal. Complexity of the task can be increased by increasing the stimuli; reaction time and correct response are recorded.

Healthy adult volunteers will be tested establish a stable baseline response using the choice reaction time. The subjects will then, on separate testing periods, be exposed to 0, 1, 50, 500, 5000 p.p.m. N_2O and to 1, 2, 5, 10, 20, 40 and 50% N_2O. After establishing an equilibrium between inspired and expired N_2O concentrations, the subjects will be tested for impair ment. Order of exposure will be randomized and an analysis of variance for repeated measures will evaluate the differences in response.

Precise description of psychomotor impairments associated with low or high concentrations of N_2O should permit the development of improved, rational guidelines for its use.

PUBLICATIONS:

Not yet available.

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PROJECT TITLE: Predicting Articulation from Cinefluorographic Measures

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Ralph L. Shelton, Ph.D.
Speech and Hearing Sciences Department
University of Arizona
Tucson, Arizona 85721

PROJECT NUMBER: RO1 DE-03350

PROJECT PERIOD: 9/70 - 11/80

PURPOSE:

The overall purpose of this project is to predict the success of articulation therapy and to investigate and develop improved treatment methods. The research is also intended to:

(1) aid in early identification of children with defective speech and in the development of effective intervention procedures for use by parents.

(2) predict articulation change that occurs either spontaneously or in response to treatment.

Some of the variables considered are psychosocial, such as various characteristics of the learner's age, intelligence and personality variables. However, most of the project is physiologically oriented, and specific findings are largely concentrated in those particular areas.

METHODS AND FINDINGS:

This is a long-term study which focuses on the identification of subgroups within a large sample of children who misarticulate. Currently this project deals with two groups of children: individuals with structural defects such as cleft palate incompetency, and groups of school children who misarticulate for other unknown reasons. A number of related investigations examine measures of treatment effectiveness in relationship to individual and treatment variables.

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PUBLICATIONS:

Arndt, W. B., Elbert, M., and Shelton, R. L.: Prediction of articulation improvement with therapy from early lesson sound production task scores. J. Speech Hearing Res. 14:149-153, 1971.

Johnson, A. F., Shelton, R. L., Arndt, W. B., and Furr, M. L.: A factor analysis of measures of articulation, language, auditory processing, reading-spelling, and maxillofacial structure. J. of Speech and Hearing Res. 20:319-324, 1977.

Morris, H. L., Shelton, R. L., and McWilliams, B. J.: Assessment of speech, ASHA Report #9, 1973.

Morris, H. L., McWilliams, B.G., and Shelton, R. L.: Research strategies. ASHA Report #9, 1973.

Shelton, R. L., Johnson, A. G., and Arndt, W. B.: Monitoring and reinforcement by parents as a means of automating articulatory responses. Perceptual and Motor Skills 35:759-767, 1972.

Shelton, R. L., Morris, H. L., and McWilliams, B. J.: Nonsurgical management of Cleft-Palate speech problems. ASHA Report #9, 1973.

Shelton, R. L., Johnson, A. F., and Arndt, W. B.: Variability in judgments of articulation when observer listens repeatedly to the same phone. Perceptual and Motor Skills 39:327-332, 1974.

Shelton, R. L., Johnson, A. F., Willis, V., and Arndt, W. B.: Monitoring and reinforcement by parents as a means of automating articulatory responses: II. Study of preschool children. Perceptual and Motor Skills 40:599-610, 1975.

Shelton, R. L.,: Discussion of Leija McReynold's behavioral and linguistic consideration in children's speech production: clinical implications. In Kavanagh, J. F. and Strange, W. (Eds.): Speech and Language in the Laboratory, School and Clinic. Cambridge, Mass., MIT Press, 1978.

Shelton, R. L.: Oral Sensory Function in speech production and remediation. In Bzoch, K. R. (Ed.): Communicative Disorders Related to Cleft Lip and Palate, 2nd Ed. Boston, Little, Brown, and Co., 1979.

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PROJECT TITLE: Studies of Acupuncture in Dental Pain

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Gene M. Smith, Ph.D.
Department of Anesthesia
Massachusetts General Hospital
Boston, Massachusetts 02114

PROJECT NUMBER: R01 DE-03951

PROJECT PERIOD: 6/74 - 12/77

PURPOSE:

The purpose of this study was to conduct a series of controlled experimental and clinical studies, designed to determine whether acupuncture is efficacious as an analgesic, and, if so, under what circumstances, with what kinds of pain, and in what kinds of test subjects.

METHODS AND FINDINGS:

This study used several techniques of acupuncture stimulation (varying by depth and anatomical location of needles, size of needles, type of stimulation of the needles, etc.) applied by 15 acupuncturists. All acupuncturists were experienced in the clinical use of acupuncture for suppression of pain. The pain studied was of three types: ischemic pain induced by the Submaximum Effort Tourniquet Technique, radiant heat pain, and acute periodontal surgical pain. The anatomical location of pain included arms, legs, back, and the gingiva.

More than 1000 experimental trials were performed on 260 healthy volunteer subjects. Of these, 210 were Caucasian males of college age (21-30). Effects of acupuncture were compared with a variety of standards: 10 mg of intravenous morphine; 20 grains of aspirin, placebo tablets, placebo injection, placebo acupuncture (in which needles were inserted into areas considered

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to be noninfluential regarding pain) and a no-treatment condition in which the subject was aware that nothing was being done by the experimenter to suppress pain. Acupuncture is significantly superior to a no-treatment condition, but it is not significantly superior to placebo acupuncture, to placebo tablets, or to placebo injections. It seems likely that the effectiveness of acupuncture, when exhibited, occurs by virtue of psychological mechanisms (e.g., expectation and desire to perceive an effect) that are thought to be operative in other placebo responses.

PUBLICATIONS:

Not yet available.

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H. DIFFUSION AND ADOPTION OF RESEARCH FINDINGS

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PROJECT TITLE: Dental Conference on Behavioral/Social Sciences

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Howard L. Bailit, Ph.D., D.M.D.
Department of Behavioral Sciences and Community Health
School of Dental Medicine
University of Connecticut
Farmington, Connecticut 06032

Organization: American Association for Dental Research
734 - 15th Street, N. W., Suite #809
Washington, D. C. 20005

PROJECT NUMBER: R13 DE-05319

PROJECT PERIOD: 8/78 - 12/79

PURPOSE:

The long term conference goals were to (1) increase the amount and quality of dental research activities in the behavioral and social sciences, and (2) to focus attention of behavioral and social scientists on specific dental research problems of high priority.

METHODS AND FINDINGS:

The conference focused on two related issues: (1) the psychological, social and economic impact of oral disease on individuals and populations, and (2) factors that influence the oral health behavior of individuals.

The conference brought 80 dental and behavioral/social scientists together for a two-day meeting at which four prepared papers and two prepared critiques of each paper were presented. The topics included psychological, social and financial impact of dental disease; influencing individuals through providers; influencing individuals through institutions; and influencing individuals through communities.

PUBLICATIONS:

Bailit, H. and Silversin, J.: Oral Health Behavior: Review and New Directions, J. of Behav. Med. 4:239-375, 1981.

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PROJECT TITLE: Cost Analysis of Implementing School-Based Community Mouthrinse Programs

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Janet Ann Brunelle, M.S.
and
Ann J. Miller, Ph.D.
Caries Prevention and Research
National Institute of Dental Research
National Institutes of Health
Bethesda, Maryland 20205

PROJECT NUMBER: Z01 DE-00225

PROJECT PERIOD: 1976 - active

PURPOSE:

Data on costs of administering the program, student participation and caries experience were collected from communities participating in demonstrations of school-based mouthrinse programs. Analysis of implementation costs, acceptance of community and cost-effectiveness is being performed.

METHODS AND FINDINGS:

Data on costs of personnel, consumable materials, permanent equipment and building overhead were collected from seventeen participating sites. Participation statistics from consent forms, attendance and drop-out records were also collected and evaluated.

Participation in the elementary classes was high throughout the four school years. Of the total eligible population, an average of 83% gave consent to participate in the mouthrinse programs. Highest levels of participation were in the lower grades with the rates declining into the upper grades.

Real costs for supplies and equipment only, averaged less than 50¢ per child per year for the seventeen sites. Personnel costs ranged from zero to almost nine dollars per child with an

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average of approximately three dollars for all programs. Cost-effectiveness for the elementary grades ranged from 40¢ to $6.00 per child per year per surface saved.

The demonstration programs show that the procedure is readily accepted by school systems, parents and children in the elementary grades. Measures of cost-benefit indicate that the procedure is highly cost-effective under a variety of administrative systems. The nominal fee for materials makes it affordable to almost any community which desires to implement such a program.

PUBLICATIONS:

Brunelle, J.A., and Miller, A.J.: Cost analysis of school-based mouthrinse programs in 17 communities in the U.S. and Guam. J. Dent. Res. 58:388, 1979 (abstract).

Miller, A.J. and Brunelle, J.A.: Fluoride rinses. In R.E. Stewart, K.C. Troutmann, T.K. Barber and S.H. Wei (Eds.): Pediatric Dentistry: Scientific Foundations and Clinical Practice. St. Louis, Mo., C. V. Mosby Co., 1981. (In press)

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PROJECT TITLE: Diffusion of Preventive Health Measures to Schools

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Jacob B. Silversin, D.M.D., M.P.H.
Department of Dental Care Administration
Harvard School of Dental Medicine
Harvard University
Boston, Massachusetts 02115

PROJECT NUMBER: RO1 DE-05115

PROJECT PERIOD: 9/78 - active

PURPOSE:

This research is designed to determine which factors predict adoption or non-adoption of a primary preventive health measure in a non-medical setting. Its specific objectives are to discover factors that discriminate between the adoption and non-adoption of the fluoride rinse program in public school districts of the United States and the extent to which, and reasons why, programs are adopted inaccurately, or adopted and then discontinued.

METHODS AND FINDINGS:

Diffusion of innovation and previous research of diffusion of medical and educational innovations serve as the study's theoretical framework. The characteristics of the innovation studied are cost, divisibility, complexity and communicability. Characteristics of the school district as the adoption unit are also being analyzed. These eight specific hypotheses will be tested:

1) Large schools are predicted to have had more information-ation about fluoride rinse than small schools.
2) Schools that have heard about the rinse through personal communication are more likely to adopt than

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those who have heard about it through other means.

3) Urban schools are less likely to adopt than suburban and rural schools.
4) The predicted variables that would discriminate best between adopting superintendents and non-adopting ones are the superintendent's perception of the cost and the political consequences associated with adoption.
5) Variables predicted to discriminate between adopting principles and non-adopting ones are their perceptions of the difficulty in implementing the program, divisibility, (i.e., whether it is possible to do on a limited basis), and previous experience with other preventive health service measures.
6) School districts with health personnel who believe in the efficacy of the fluoride rinse program are more likely to adopt than schools without such personnel.
7) The presence of dental personnel in the implementation process is likely to facilitate the fluoride rinse program.
8) Those variables that work in discriminating between adopters and nonadopters of the fluoride rinse program are also likely to predict other health innovations.

Primary sample survey research methodology is used in the study. In a four-phased sequenced program, data are being nationally collected from school district supervisors, principles, and school health personnel, within 15,024 school districts in the United States.

PUBLICATIONS:

Coombs, J. A., Silversin, J. B., and Drolette, M. E.: Policy research related to the diffusion of medical technologies. J. Dent. Ed. 44:520-5, 1980.

Coombs, J. A., Silversin, J. B., Rogers, E. M., and Drolette, M. E.: The transfer of preventive health technologies to schools: a focus on implementation. Soc. Sci. and Med., (in press).

Silversin, J. B., Coombs, J. A., and Drolette, M. E.: Achievements of the seventies: self-applied fluorides. J. Pub. Health Dent. 40:248-57, 1980.

Silversin, J. B., Coombs, J. A., and Drolette, M. E.: Adoption of dental preventive measures in the United States schools. J. Dent. Res., 1980. (In press).

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I. BEHAVIORAL AND SOCIAL SCIENCE RESEARCH TRAINING

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PROJECT TITLE: Behavioral Science (Psychology) in Dental Research

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

Richard I. Evans, Ph.D.
Psychology Department
University of Houston
Houston, Texas 77004

PROJECT NUMBER: T01 DE-00138

PROJECT PERIOD: 1/64 - 8/76

PURPOSE:

The goal of the training program was to expand the training of Ph.D. candidates in experimental-social psychology so that they would be competent and motivated to conduct psychosocial research related to dentistry.

METHODS AND FINDINGS:

Through lectures, seminars and supervised research projects, trainees were exposed to the behavioral science aspects of dental problems.

The impact of the program on the fourteen doctoral and post-doctoral trainees has been significant. Many of them have taken academic positions, and most of them are involved in health-research related activities.

PUBLICATIONS:

Bailey, D.: An assessment of reliability analyses for direct behavioral observation. (Dissertation)

Bane, A.: The role of information and belief in adolescent smoking behavior. (Dissertation)

Evans, R. I., Rozelle, R. M., Lasater, T. M., Dembrowski, T. M., and Allen, B. P.: Fear arousal, persuasion and actual vs. implied behavior change: New perspective utilizing a real-life dental hygiene program. J. Pers. Soc. Psychol. 16(2):220-227, 1970. (1970*)

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Evans, R. I., Rozelle, R. M., Noblitt, R., and Williams, D. L.: Feedback and unintentional treatment effects as deterrents of behavior reversion in persuasive communication: New perspective utilizing a real-life dental hygiene situation. Ibid. 5:150-156, 1975. (1973*)

Evans, R. I.: Smoking in children: Developing a social psychological strategy of deterrence. Prev. Med. 5:122-127, 1976.

Goodrick, K.: Health behavior: Behavioral intention and behavioral intervention. (Dissertation)

Love, R.: The resolution of conflicts of interests and ideologies in inter-religious decision making groups: A dynamic simulation of community relations. (Dissertation)

Stout, L.: Contingency management procedures to minimize procrastination in individualized instruction. (Dissertation)

Williams, D.: The influence of measurement operations in affecting attitude-behavior change: Perspective from a real-life dental hygiene situation. (Dissertation)

*APA Division 13 Research Excellence Award recipient.

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PROJECT TITLE: Mechanisms and Control of Craniofacial Pain

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

John M. Gregg, D.D.S., Ph.D.
University of North Carolina
School of Dentistry
Chapel Hill, North Carolina 27514

PROJECT NUMBER: T32 DE-07018

PROJECT PERIOD: 7/76 - 6/81

PURPOSE:

The purpose of this research training program is the training of postdoctoral investigators for academic careers in research, teaching, and patient care related to craniofacial pain and its control.

METHODS AND FINDINGS:

This training program includes both laboratory and clinical experience and is structured to develop independent research skills in trainees. Research training focuses on mechanisms and control of pain with a primary, though not exclusive, focus upon craniofacial pain.

PUBLICATIONS:*

Barber, T.X., Wilson, S.C., and Scott, D.S.: Effects of a traditional trance induction on response to "hypnotist-centered" versus "subject-centered" test suggestions. Int. J. Clin. Exp. Hypn. (In press).

Duncan, G.H., Gregg, J.M., and Galich, J.W.: A method for quantitative histological evaluation of neural cell populations. Anat. Rec. 188:273-275, 1977.

Duncan, G.H., Gregg, J.M., and Ghia, J.N.: The pain profile: A computerized system for assessment of chronic pain. Pain 5:275-284, 1978.

Ghia, J.N., Toomey, T.C., Mao, W., Duncan, G. and Gregg, J.M.: Towards an understanding of chronic pain mechanisms: The use of psychological tests and a refined differential spinal block. Anesthes. 50:20-25, 1979.

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Ghia, J.N., Mueller, R.A., Mao, W., Scott, D.S., Duncan, G.S., and Gregg, J.M.: Variations in lumbar CSF 5-HIAA in man as a function of pain, pain mechanisms and depression. Biol. Psychtry. (In press).

Moore, P.A.: Conscious psychosedation for pain and anxiety control in dentistry. Wkly. Anesthes. Update. (In press).

Moore, P.A. and Burney, R.: The analgesic properties of lidocaine in mice. Anesth. Analg. 58:329-330, 1979.

Moore, P.A. and Deuben, R.R.: Steriod dependence on lidocaine chronotoxicity. International Symposium on Clinical Chrono-Pharmacy, Chrono-Pharmacology, and Chrono-Therapeutics. (In press).

Moore, P.A., Smudski, J.W., and Hopper, S.: Diphenyl-hydantoin induction of gingival hyperplasia in ferrets: A precautionary note. J. Dent. Res. (In press).

Moore, P.A., Duncan, G.H., Scott, D.S., Gregg, J.M. and Ghia, J.N.: The submaximal effort torniquet test: Its use in evaluating experimental and chronic pain. Pain 6:375-382, 1979.

Rosenstiel, A.K. and Scott, D.S.: Four considerations in using imagery techniques with children. J. Behav. Ther. Exp. Psychiatry 8:287-290, 1977.

Scott, D.S.: A comprehensive treatment strategy for muscle contraction headaches. J. Behav. Ther. Exp. Psychtry. (In press).

Scott, D.S.: Experimenter-suggested cognitions and pain control: The problem of spontaneous strategies. Psych. Rep. 43:156-158, 1978.

Scott, D.S. and Barber, T.X.: Cognitive control of pain: Effects of multiple cognitive strategies. Psych. Rec. 2:373-383, 1977.

Scott, D.S. and Barber, T.X.: Cognitive control of pain: Four serendipitous results. Percept. Mot. Skills 44:569-570, 1977.

Scott, D.S. and Leonard, C.: The modification of pain threshold by the covert reinforcement procedure and a cognitive strategy. Psych. Rec. 28;49-57, 1978.

Scott, D.S. and Rosenstiel, A.K.: Covert positive reinforcement studies: Review, critique and guidelines. Psychother.: Theory, Res. Pract. 12:375-385, 1975.

* partial list

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PROJECT TITLE: Research Training Program in Pain Control and Human Motivation

PRINCIPAL INVESTIGATOR AND ORGANIZATION:

S. Stephen Kegeles, Ph.D.
Department of Behavioral Sciences and Community Health
School of Dental Medicine
University of Connecticut
Farmington, Connecticut 06032

PROJECT NUMBER: T32 DE-07004

PROJECT PERIOD: 7/76 - 6/79

PURPOSE:

The goal of the program was to bring post-doctoral trainees to levels of knowledge and experience sufficient for them to conduct research in health motivation and behavior.

METHODS AND FINDINGS:

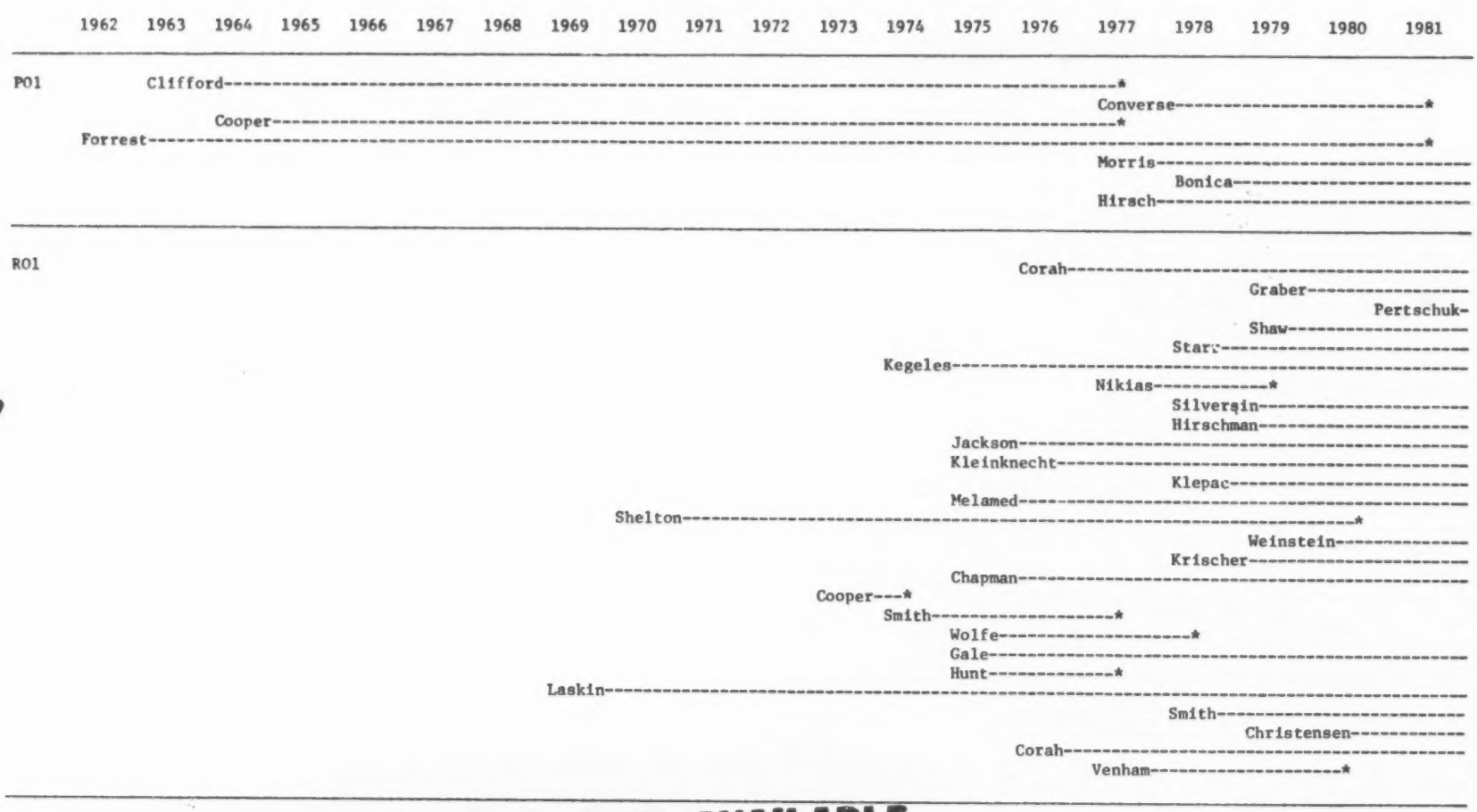
The program trained post-doctoral Fellows for research careers focusing on motivation toward and compliance with health regimens. Emphasis was placed on content in appropriate behavioral science fields, on research methodology and on training in ongoing research projects. The training was provided in a dental school academic department which included included faculty who were sociolcgists, epidemiologists, economists, psychologists and dentists.

Four post-doctoral fellows were trained; three made career changes and have begun careers as independent health researchers.

PUBLICATIONS:

None.

TABLE I: Summary of Behavioral and Social Science Research Support by Year and Mechanism.



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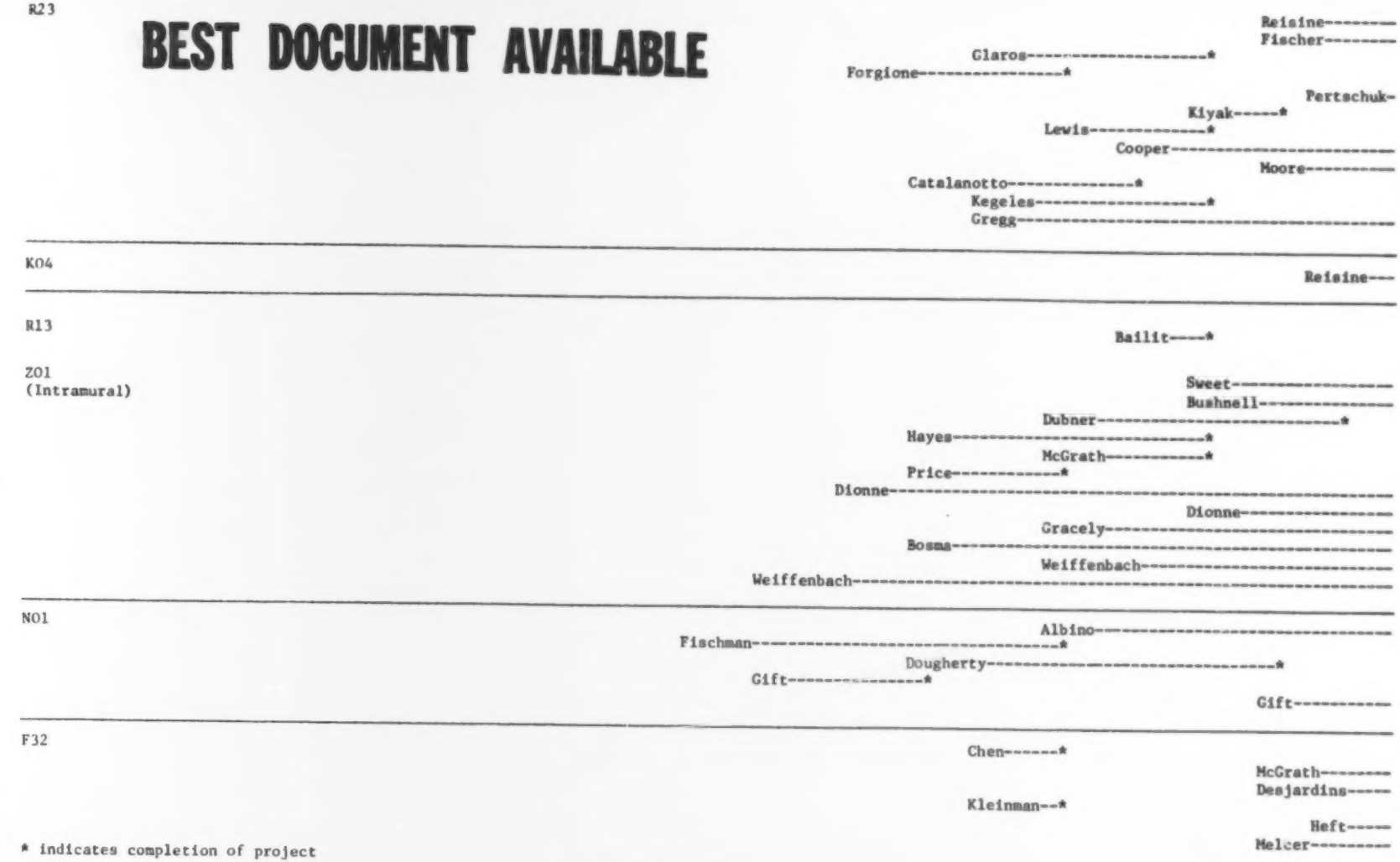

* indicates completion of project

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